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ABSTRACT

An instructor's manual and student activity guide on making a hanging basket bracket are provided in this set of prevocational education materials which focuses on the vocational area of trade and industry (metal work). (This set of materials is one of ninety-two prevocational education sets arranged around a cluster of seven vocational offerings: agriculture, home economics, distributive education, health occupations, world of work, trade and industry, and office occupations.) The instructor's guide is organized into the following elements: title of activity, duration of activity (six periods), activity goals, instructional objectives, and activity implementation (description, materials needed, safety considerations, teacher preparation prior to class, during the class, follow-up activities, and masters for duplication [e.g., final drawing of project, student answer sheet]). The student activity guide provides step-by-step instructions (narrative and illustrations) for completing each instructional objective (e.g., use a square and scribe to mark lines on metal, use a hand drill and pop rivet gun). At the end of each set of instructions is a student check point (evaluation activity). Occupational descriptions for a drill-press operator, vertical contour-band-saw operator, and machinist conclude the document. (JH)

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ED169311

METAL WORK – MAKING A HANGING BASKET BRACKET

Kit No. 22

INSTRUCTOR'S MANUAL

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In Cooperation With

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1978

CE 020 496

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TITLE OF ACTIVITY

Kit No. 22, Metal Work – Making A Hanging Basket Bracket

DURATION

Main Activity – 4 periods
Follow-up Activity – 2 periods

GOALS AND INSTRUCTIONAL OBJECTIVES

FIRST DAY:

Introduction to Measuring and Layout. The student will read the material on Measuring and Layout and do the Check Points provided at the end of each activity. The student will be able to use a metal rule to make measurements, use a square and scribe to mark tines on metal.

SECOND DAY:

Introduction to Hack Sawing and Filing. The student will read the material on Hack Sawing and Filing and do the Checkpoints provided at the end of each activity. The student will be able to hold and use the saw correctly. The student will be able to use the file correctly.

THIRD DAY:

Introduction to the Vise. The student will read the material on the vise and then do the Checkpoint provided at the end of the activity. The student will be able to use the vise correctly and safely.

FOURTH DAY:

Introduction to the Hand Drill and Pop Rivet Gun. The student will read the material on the drill and pop rivet gun and do the Checkpoint provided at the end of this activity. The student will be able to safely use the hand drill and pop rivet gun.

FIFTH DAY:

Using all the information that has been covered, the student will measure, cut, file, bend, drill and put together the hanging basket bracket. The student will gain self-confidence and pride in his/ her work, and gain experience in using various hand tools.

SIXTH DAY:

Complete projects started on the fifth day.

VOCATIONAL CLUSTERS

Trade and Industry

ACTIVITY IMPLEMENTATION

A. Activity Description

FIRST DAY: The student will read the material on Measuring and Layout and do the Checkpoint.

SECOND DAY: The student will read the material on Hack Sawing and Filing and do the Checkpoint.

THIRD DAY: The student will read the material on using a Vise and do Checkpoint.

FOURTH DAY: The student will read the material on Drilling and Pop Rivet Gun and do Checkpoint.

FIFTH DAY: Using the step-by-step directions in the follow-up activity, the student will make a hanging basket bracket.

SIXTH DAY: The student will complete the bracket.

B. Safety

Be careful when using the scribe because it has a sharp point.

Be sure the handle on the file is on tight.

Be sure the vise is clamped securely to the work bench.

Be sure the metal is clamped tightly in the vise before sawing, filing, bending or drilling it.

Wear safety glasses at all times when using a hand drill.

Be sure the cord on the electric drill is in good shape.

Remove chuck key from drill before starting it.

Unplug drill cord while changing drill bit.

C. Materials Required

1. Audio Visual Equipment
   None

2. Technical Equipment
   25 metal rules
   5 – 6" (15.24 cm) steel squares
   5 scribes
   5 center punches
   5 hack saws
   5 - 8" (20.32 cm) smooth files

5 wooden handles for files
5 - 3" (7.62 cm) vises
5 - 8 ounce (226.8 g) Ball peen hammers
3 - ¼" electric drills
3 pop rivet guns
5 safety glasses

3. Expendable Materials
1 box 1/8" (.3175 cm) Pop rivets: Broadhead Gorret
60 feet (18.288 m) ½ x 1/8 hot rolled steel strips: Elgcomb Steel
5 - 1/8" (.3175 cm) drill bits
5 - ¼" (.635 cm) drill bits

D. Preparation Prior to Class

Order 60 feet of ½ x 1/8 hot rolled strips per twenty five students.

Have 1 box 500 pop rivets.

Duplicate student answer sheet for each student.

Read over the activity guide and be aware of areas where safety rules are used.

E. During Class Session

The instructor is to make it clear that no one is do do any activity out of sequence. Tell the student to turn to page one of Programmed Text for Metal Work. Read the introduction, goals, directions, and then start on the Programmed Text, Instructional Objective I, Step 1. Read each step carefully. Check to see that each Checkpoint is completed and done correctly. By now the student should be adjusted to how the programmed text works. Let the students work at a steady pace — not too fast nor too slow. See that safety rules are followed and correct usage of each tool is observed. The main point to remember is to allow NO horseplay or clowning around. It is easy enough to get hurt using hand tools without help from someone else.

F. Follow-up Activity

Have students fill out VIEW Fact Sheet.

Using want ads in a newspaper, students will locate advertisements for jobs in this area, for example, a machinist.

MASTERS FOR DUPLICATION

VIEW Fact Sheet
Final Drawing of Project
Student Answer Sheet

VIEW FACT SHEET

NAME _____ CLASS _____ OCCUPATION _____

A. List the advantages (good points) of this occupation (job).

B. List the disadvantages (bad points) of this occupation (job).

C. List three things you should know to do this occupation (job).
1.
2.
3.

D. What type of education should you get to be prepared (do) for this occupation (job)?

E. What courses must you take to go into this occupation (job)?

F. What do you think your future in this occupation (job) will be?

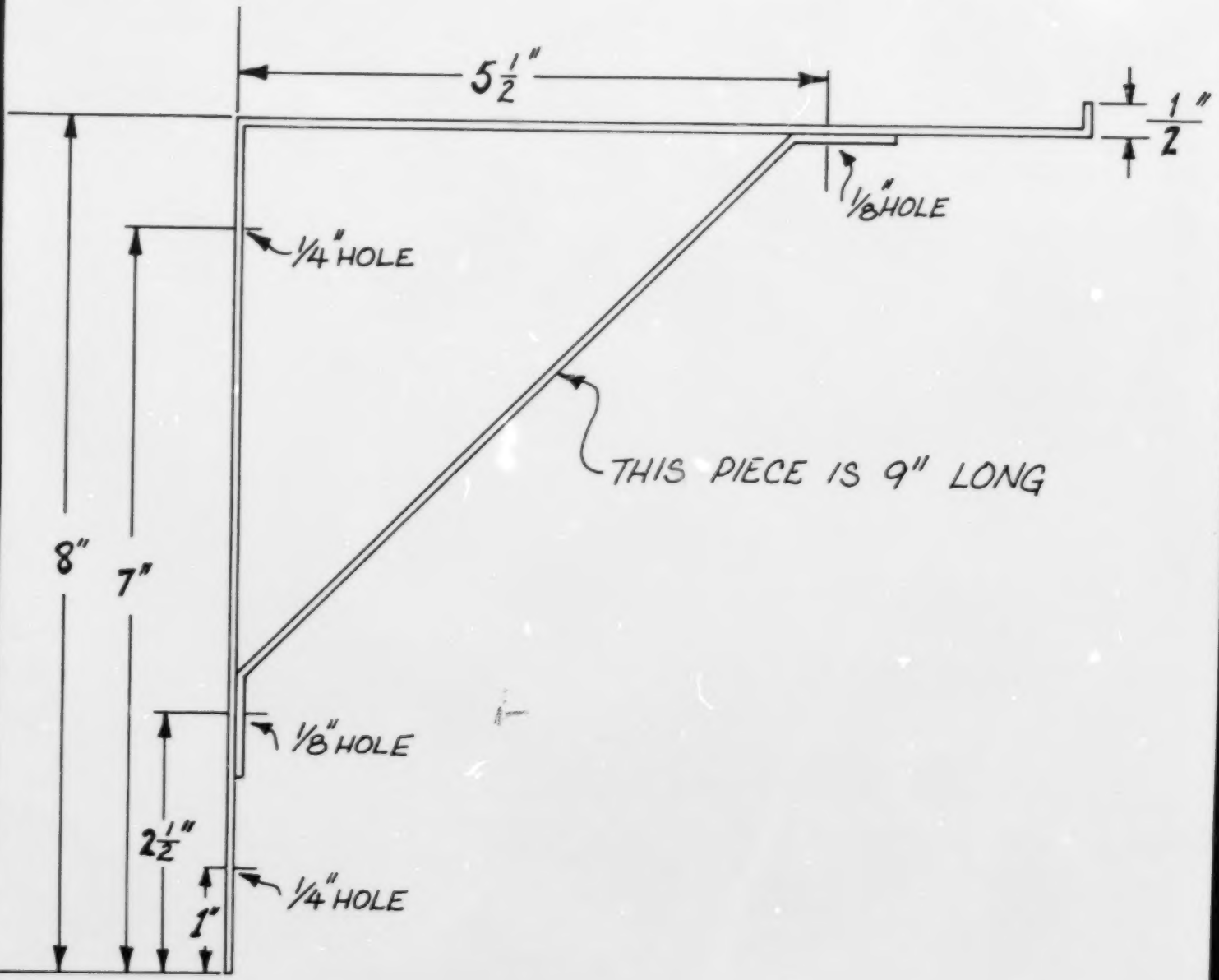
G. What wage can you expect in this occupation (job)?

H. What are the working hours of this occupation (job)?

I. To learn more about this occupation (job), write to:

J. Using a scale of 1 to 5, circle the number that measures your interest in this occupation (job) as a possible career.

I don't like it. 1 2 3 4 5 I like it.


5 1/2"
1"
2
1/8" HOLE
1/4" HOLE
THIS PIECE IS 9" LONG
8"
7"
1/8" HOLE
2 1/2"
1"
1/4" HOLE

STUDENT ANSWER SHEET

INSTRUCTIONAL OBJECTIVE I

1. _____
2. _____
3. _____
4. _____
5. _____

INSTRUCTIONAL OBJECTIVE II

1. _____
2. _____
3. _____
4. _____
5. _____

INSTRUCTIONAL OBJECTIVE III

A. _____
B. _____
C. _____
D. _____

INSTRUCTIONAL OBJECTIVE IV

A. _____
B. _____
C. _____
D. _____
E. _____

INSTRUCTIONAL OBJECTIVE V

1. _____
2. _____
3. _____

INSTRUCTIONAL OBJECTIVE VI

A. _____
B. _____
C. _____
D. _____
E. _____
F. _____

INSTRUCTIONAL OBJECTIVE VII

A. _____
B. _____
C. _____

METAL WORK – MAKING A HANGING BASKET BRACKET

Kit No. 22

STUDENT
LEARNING ACTIVITY MANUAL

Prepared by

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MAKING A HANGING BASKET BRACKET

INTRODUCTION

In this programmed text the student will be instructed in basic layout principles, using a hack saw, file, vise, and hand drill.

GOALS

The student will learn to measure with a metal rule.

The student will learn the parts of and use of a hack saw.

The student will learn the parts of and the use of a file.

The student will learn the parts of and how to use a vise.

The student will learn the parts of and how to use an electric hand drill.

The student will learn all safety rules needed to operate this equipment.

The student will learn to use a pop rivet gun.

The student will perform self test at the end of each section.

The student will make a hanging basket bracket.

DIRECTIONS

To use the programmed self-instructional method of teaching, the student will begin with the programmed text. The programmed text is a step-by-step process. In each section there will be an Instructional Objective which will explain briefly what the student is to do. The sequenced instruction is a step-by-step explanation of what is being done, it will be accompanied by a picture of each activity or a picture of the tool being explained in the sequenced directions.

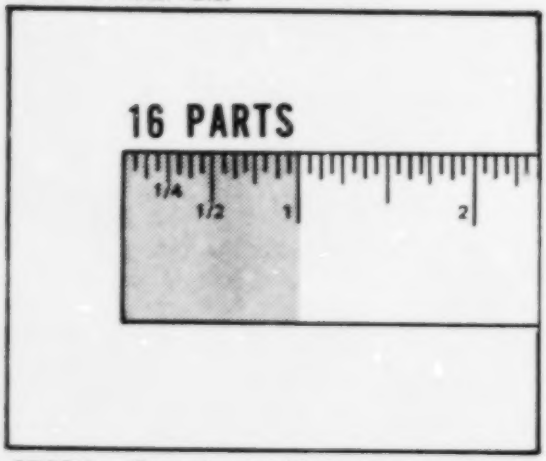
Each section of the sequenced instruction will be followed by a Checkpoint. The Checkpoint will have a practice sheet with a short quiz on what was just covered.

Be sure to follow this programmed text in correct order.

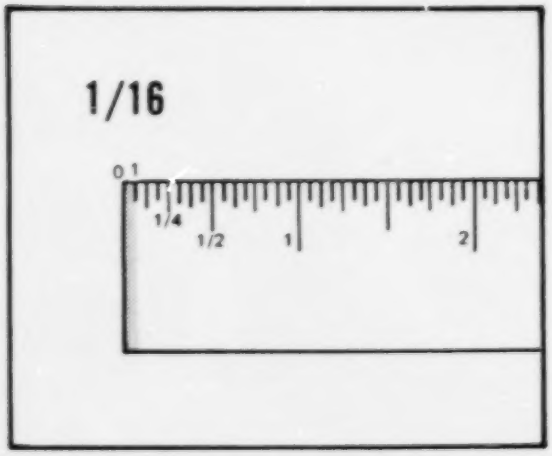
PROGRAMMED TEXT

Instructional Objective 1

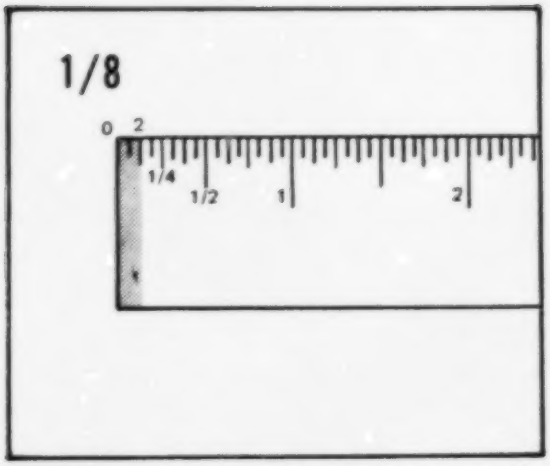
Being able to measure accurately is essential in doing metal work. A person working with metal must be able to measure lengths, read dimensions, and figure materials. Obtain a metal rule.



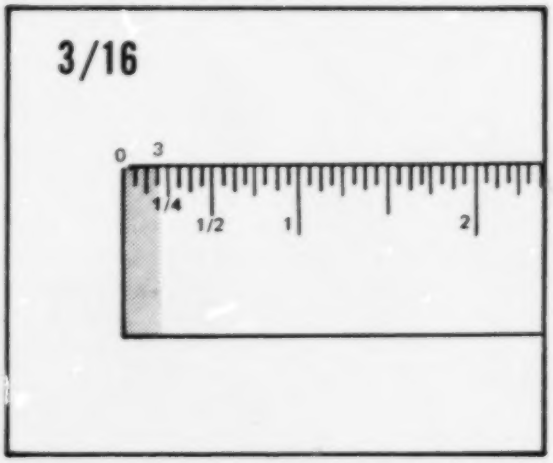
STEP 1 – To understand how to measure, you must understand the sixteen parts of an inch. This shows an inch broken down into 16 equal parts.



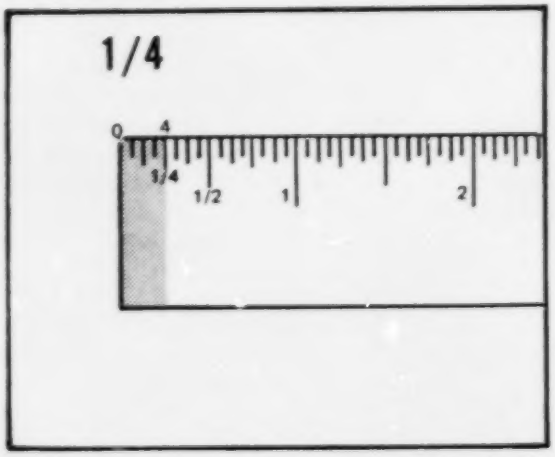
STEP 2 – From 0 to the mark labeled 1 is 1/16 inch.



STEP 3 – From 0 to the mark labeled 2 is 2/16 or 1/8 inch; we will call it 1/8 inch.

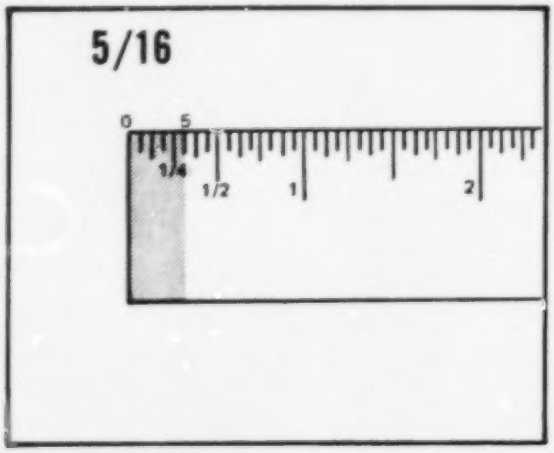


STEP 4 – From 0 to the mark labeled 3 is 3/16 inch.

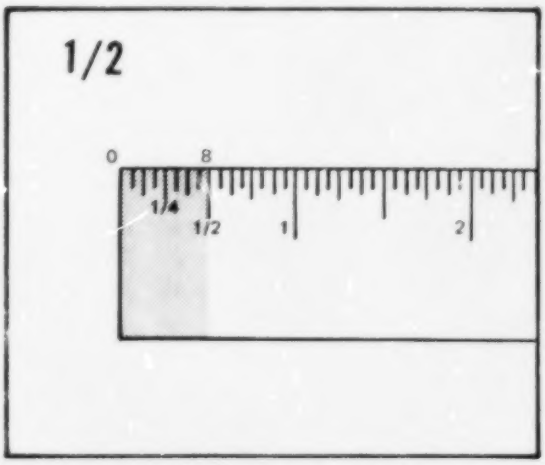


STEP 5 – From 0 to the mark labeled 4 is 4/16 inch or ¼ inch; we will call it ¼ inch.

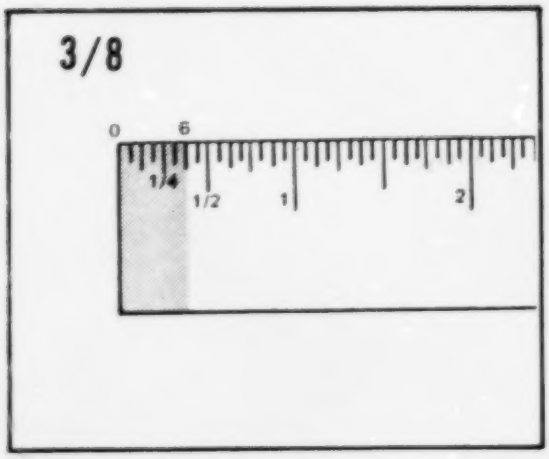
11



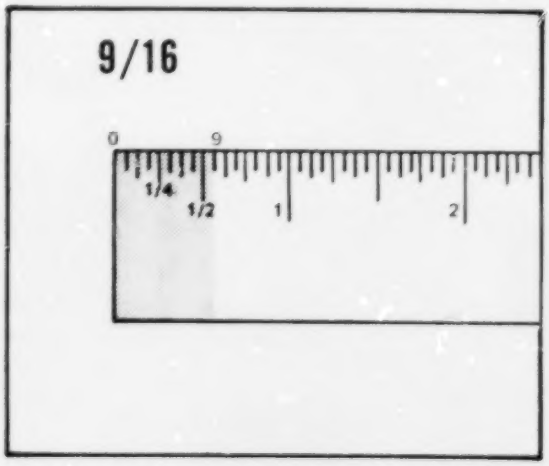
STEP 6 – From 0 to the mark labeled 5 is 5/16 inch.



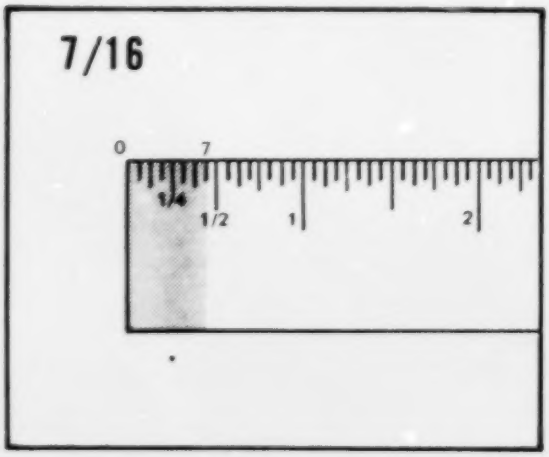
STEP 9 – From 0 to the mark labeled 8 is 8/16 inch, or ½ inch; we will call it ½ inch.



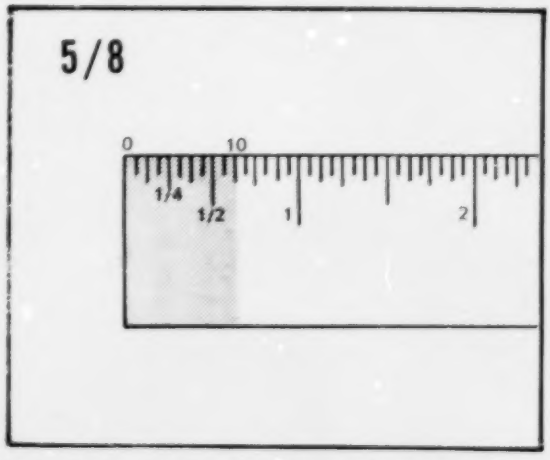
STEP 7 – From 0 to the mark labeled 6 is 6/16 or 3/8 inch; we will call it 3/8 inch.



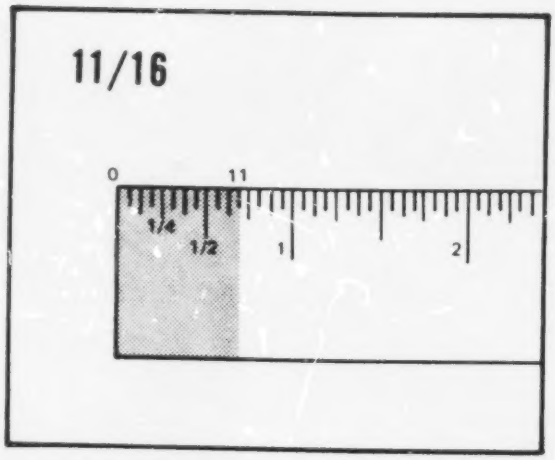
STEP 10 – From 0 to the mark labeled 9 is 9/16 inch.



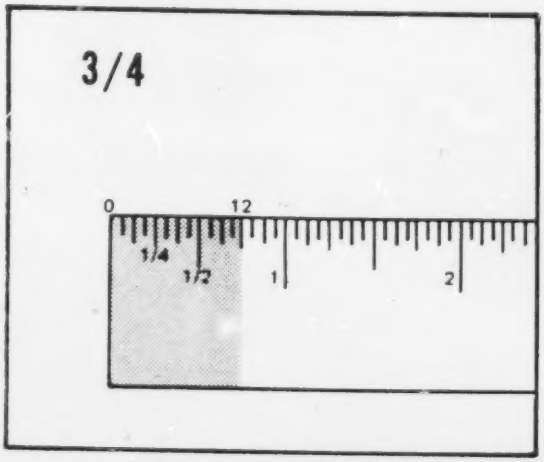
STEP 8 – From 0 to the mark labeled 7 is 7/16 inch.



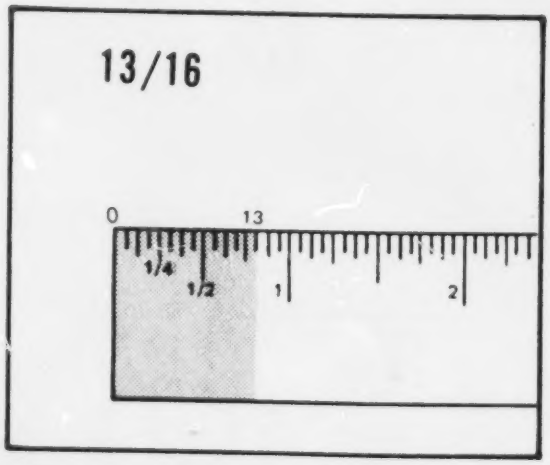
STEP 11 – From 0 to the mark labeled 10 is 10/16 inch or 5/8 inch; we will call it 5/8 inch.



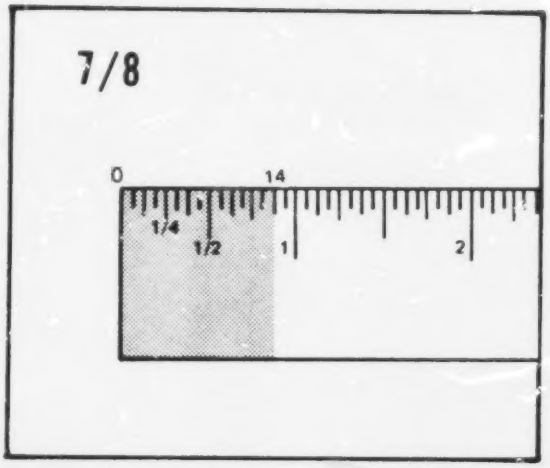
STEP 12 – From 0 to the mark labeled 11 is 11/16 inch.



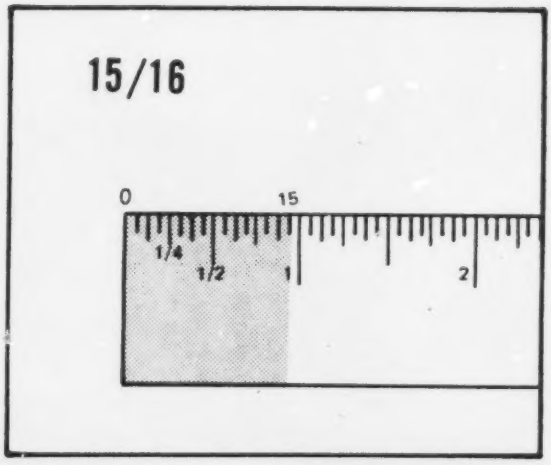
STEP 13 – From 0 to the mark labeled 12 is 12/16 or ¾ inch; we will call it ¾ inch.



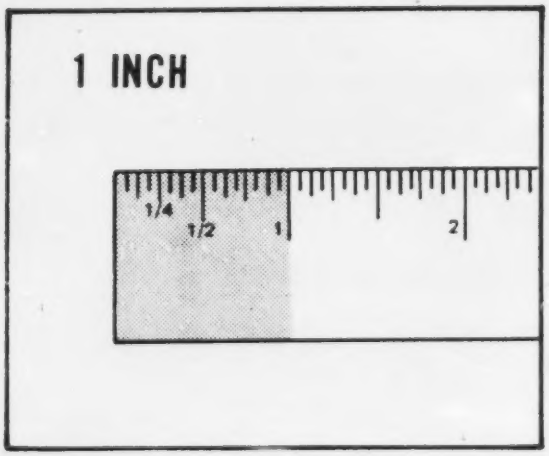
STEP 14 – From 0 to the mark labeled 13 is 13/16 inch.



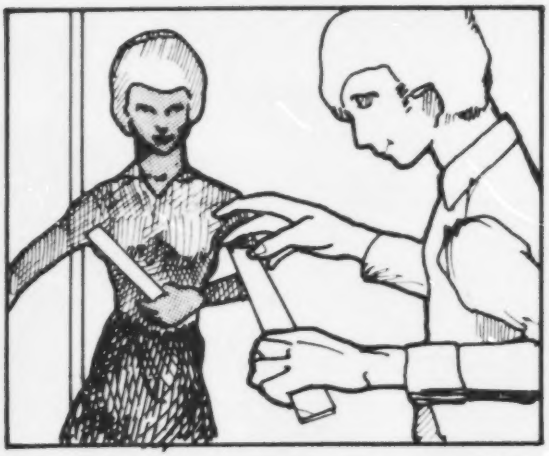
STEP 15 – From 0 to the mark labeled 14 is 14/16 or 7/8 inch; we will call it 7/8 inch.



STEP 16 – From 0 to the mark labeled 15 is 15/16 inch.



STEP 17 – From 0 to the mark labeled 16 is 16/16 or 1 inch.

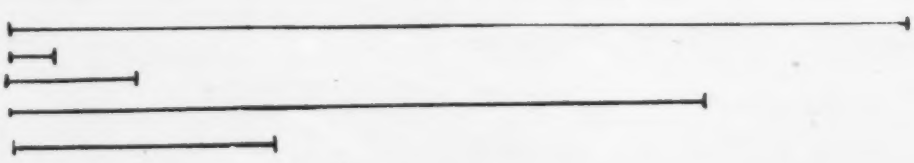


STEP 18 – Look at the first inch on the metal rule.

Check Point

Using the metal rule and Student Answer Sheet, measure the lines to the right of the letters A, B, C, D, ... Select the correct measurement and place the letter in the space to the right on Student Answer Sheet for Instructional Objective I.

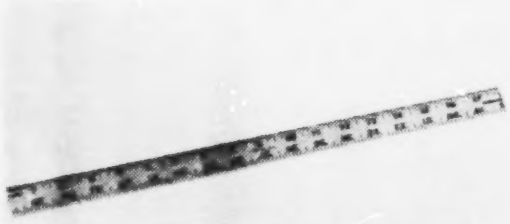
A	¾"	1
B.	4"	2
C.	¼"	3
D.	1½"	4
E.	5 1/8"	5



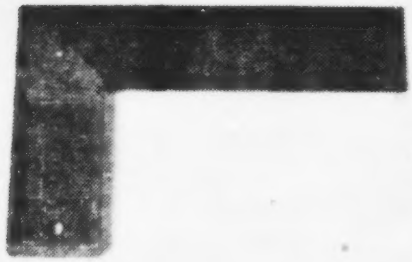
STEP 19: Check your answers.
1 – E, 2 – C, 3 – A, 4 – B, 5– D

Instructional Objective 11

The student will be able to identify and use the five basic Layout Tools.

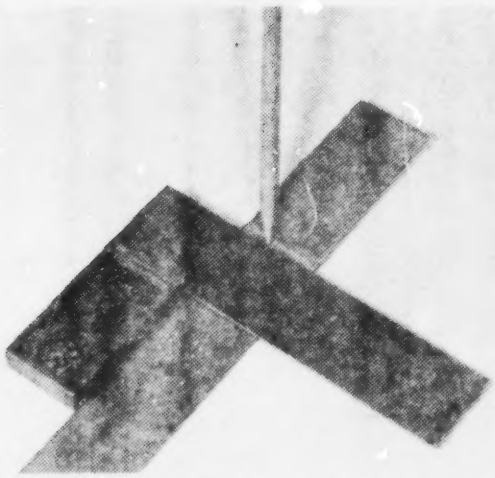


STEP 1 – The metal rule is 18 inches (45.72 cm) long and can be used as a straight edge for drawing lines.



STEP 2 – The second tool is the steel square. It is used to lay out and check right angles (90°).

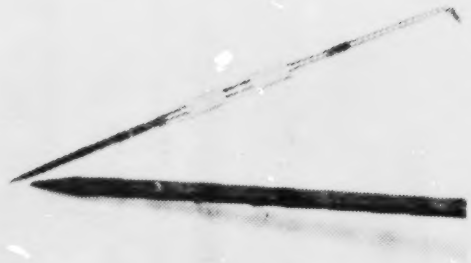
STEP 3 – To use the square place the handle against the edge of the metal.



STEP 4 – This lets the blade lie across the metal. This lets you mark a line exactly 90° or a right angle.

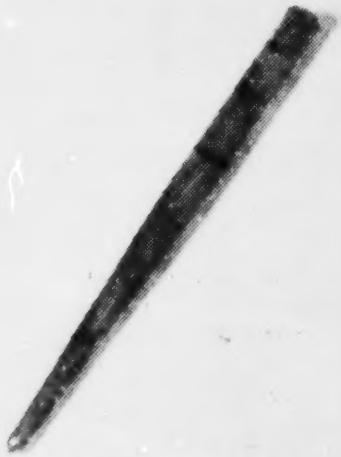
STEP 5 – The third layout tool is the scribe and it has two main parts.

STEP 6 – The first part is the handle– this is what you hold the scribe with; the second is the blade which has a sharp point and is used to scratch a mark or line on the surface of metal.



STEP 7 – SAFETY RULE: Since the scribe has a sharp point caution must be observed. This point could punch a hole in your skin or cause eye damage.

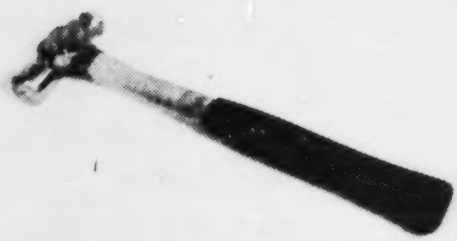
STEP 10 – The point is sharp and it is placed on a mark.



STEP 8 – The fourth layout tool is the center punch. The punch has three main parts.

STEP 11 – The head is where you tap it with a hammer lightly to cause the point to make an indention in the metal.

STEP 9 – Head, body and point; The body is what the punch is held by.



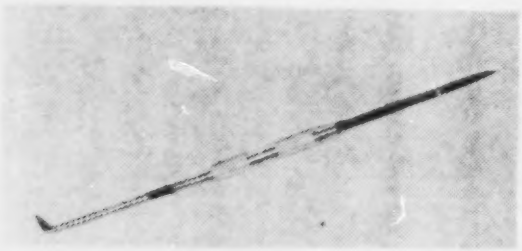
STEP 12 – The ball peen hammer is used to strike (hit) many of the metal working tools, for example the center punch.

Check Point

Match the following tools with their names by placing the correct letter in the blank on your answer sheet for Instructional Objective II.

1. Ball peen hammer
2. Scribe
3. Center punch
4. Square
5. Metal rule

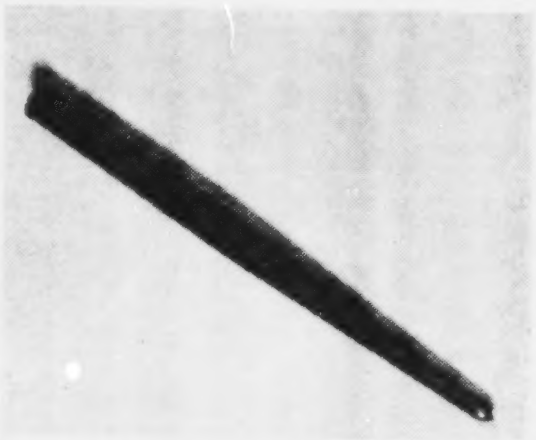
A.



B.

C.

D.

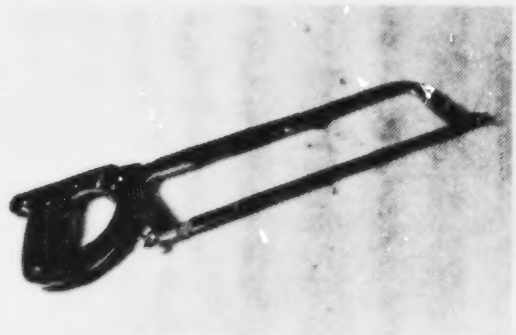


E.

STEP 13 – To check your answers: 1 - B, 2 - A, 3 - D, 4 - E, 5 - C

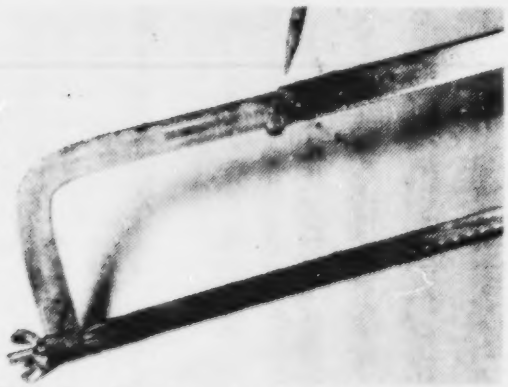
Instructional Objective III

The student will become familiar with the parts of and the proper use of a hack saw.

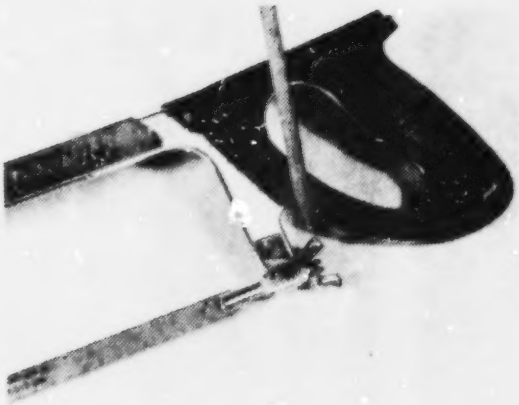


STEP 1 – The hacksaw has four major parts: The handle, frame, tension adjustment and the blade.

STEP 2 – The handle is shaped like a pistol grip to fit easily in the hand and make it more comfortable to use.



STEP 3 – The frame is shaped similar to the letter "U." IT IS ADJUSTABLE AND CAN BE SET TO FIT BLADES OF VARIOUS LENGTHS.

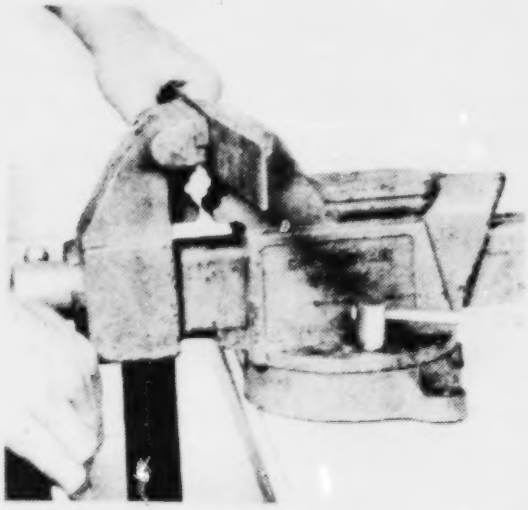


STEP 4 – The tension adjusting unit consists of wing nut and a sliding bolt. Its purpose is to apply tension on the blade.

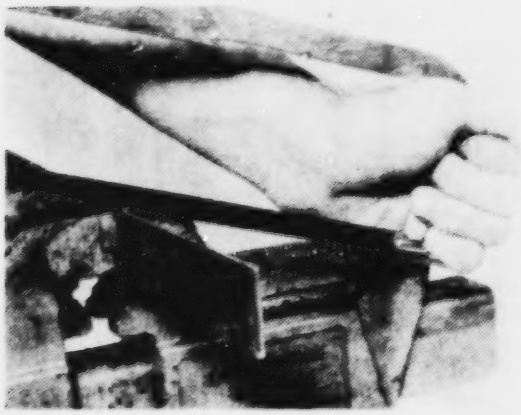
STEP 5 – The blade is ½ inch wide (1.27 cm) and 0.25 inches (.635 cm) thick. The length can be either 8 inches (20.32 cm), 10 inches (25.4 cm), 12 inches(30.48 cm). The steel in a metal cutting saw blade must be harder than the metal to be cut, therefore, these blades are made of hardened steel. The size of teeth varies according to the number of teeth per inch.

STEP 6 – Pick the saw up and check to see that the blade is inserted correctly.

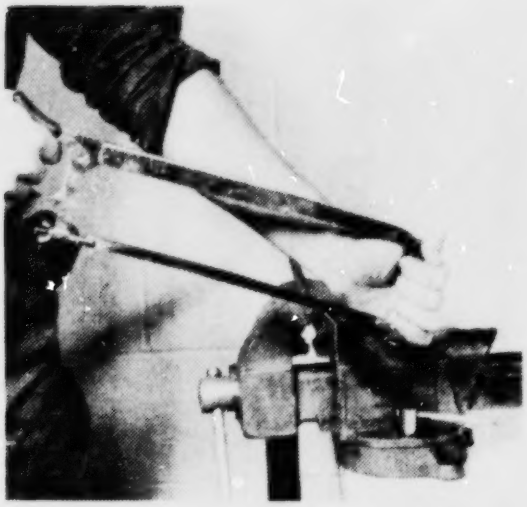
STEP 7 – Check the blade tension and adjust it if needed by turning the wing nut on the blade tension adjustment.



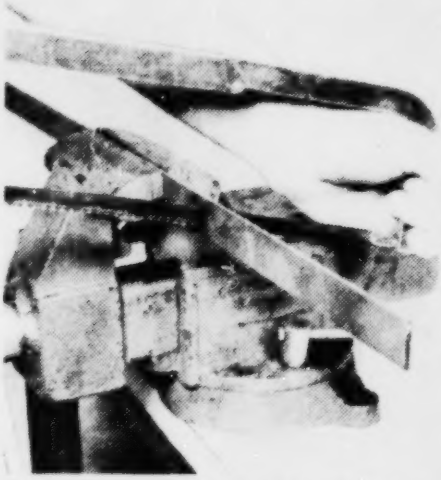
STEP 8 – The metal to be cut should be put in a vise.



STEP 9 – To start a cut, the blade should be placed on the metal with as many teeth as possible touching the metal.



STEP 10 – Stand in a relaxed position at the vise and hold the saw correctly.



STEP 11 – Put the saw blade down against the metal. Push the saw forward and apply just enough pressure to cause the blade to cut the metal.

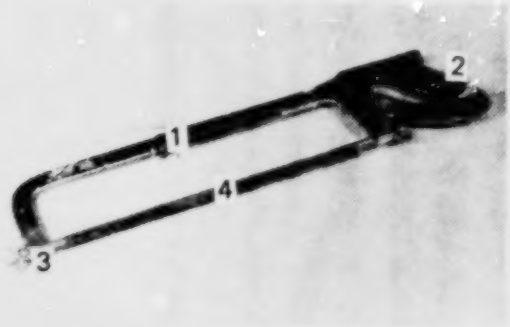
STEP 12 – Continue sawing with a light pressure until the cut is started. Do not use a rapid, jerky sawing motion; use a smooth back-and-forth motion, with a full stroke of the blade.

STEP 13 – Use less pressure on the saw when the cut is almost through the metal.

Check Point

Match the parts of the hack saw with the correct name by placing the number in the blank on your answer sheet for Instructional Objective III.

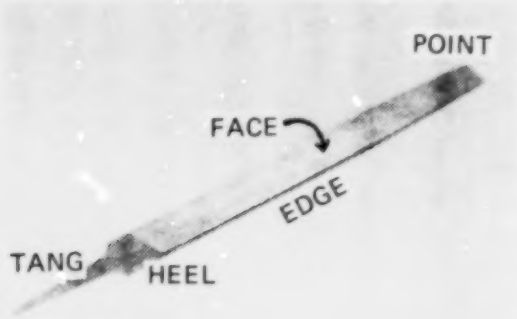
A. Tension adjustment
B. Blade
C. Frame
D. Handle



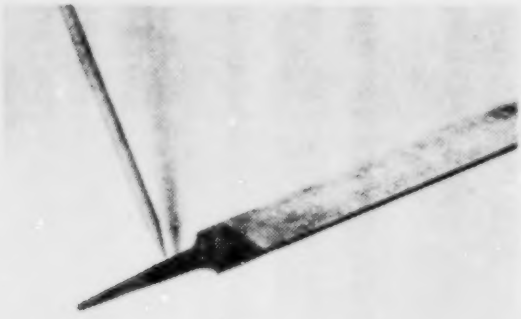
STEP 14 – To check your answers: A - 3, B - 4, C - 1, D - 2

Instructional Objective IV

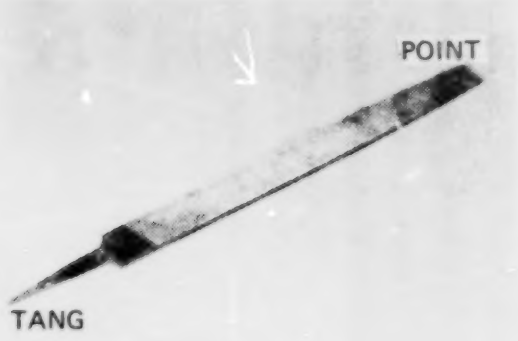
The student will identify the parts of a file and proper use of the file.



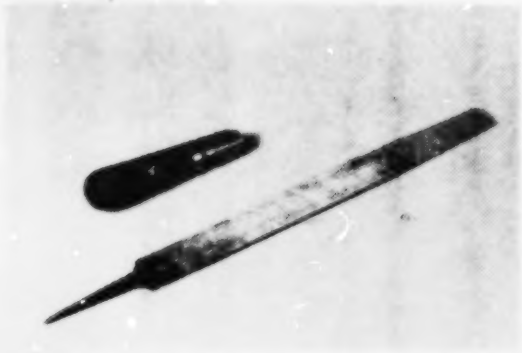
STEP 1 – There are five parts of a file: the point, face, edge, heel, and tang.



STEP 2 – The tang is the narrow end of a file where the handle is fastened.

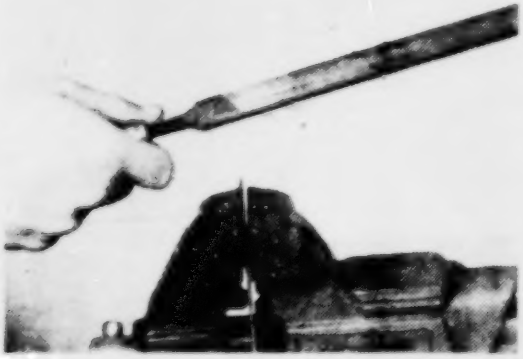


STEP 3 – The size of a file is according to its length from the end of the point to the base of the tang.

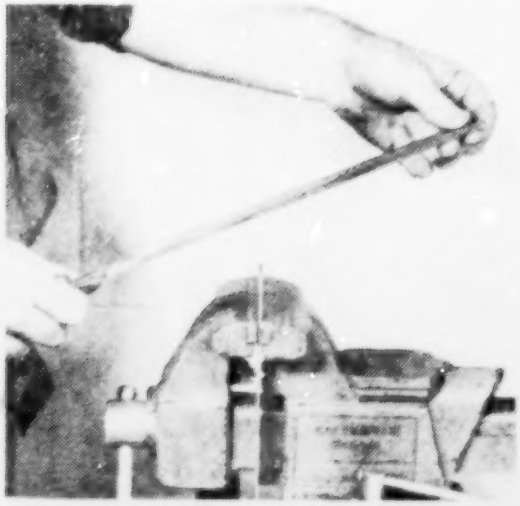


STEP 4 – A wooden handle fits on the tang and is tightened by tapping it on a table or floor.

STEP 5 – The teeth of the file are made of hardened steel because they must be harder than the metal being filed. The teeth do the cutting.



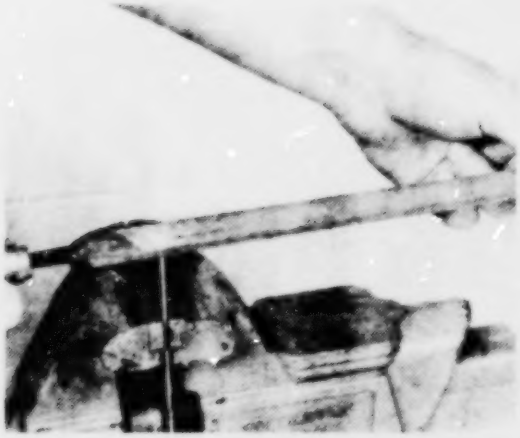
STEP 6 – Hold the handle in either the right or left hand according to which you favor.



STEP 7 – Grab the point with the thumb and first two fingers of the other hand.

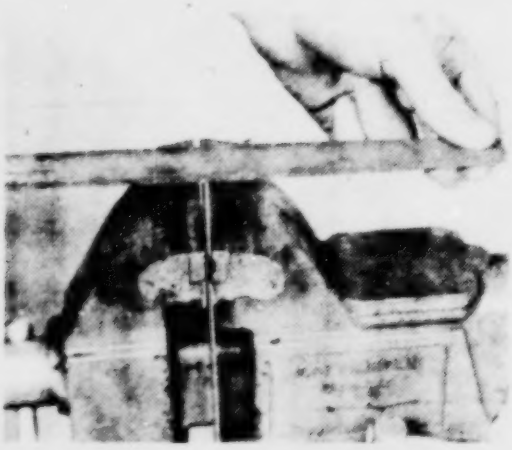
STEP 8 – Stand in a relaxed position.

STEP 9 – Place the file flat on the metal with the teeth pointing to the front.

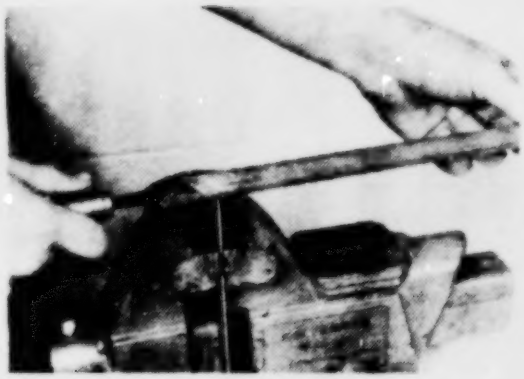


STEP 10 – Keep the file level and push it across the metal.

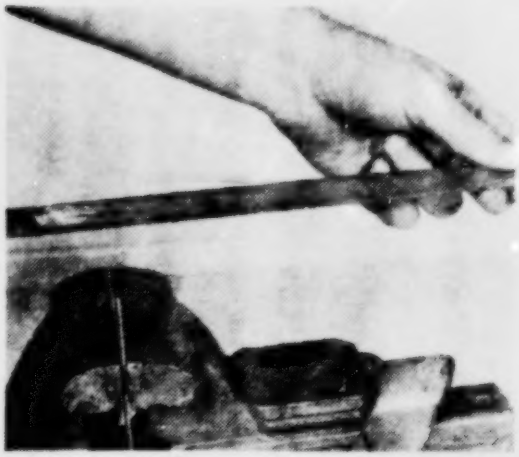
STEP 11 – Apply more pressure with the hand in front at the start of the stroke.



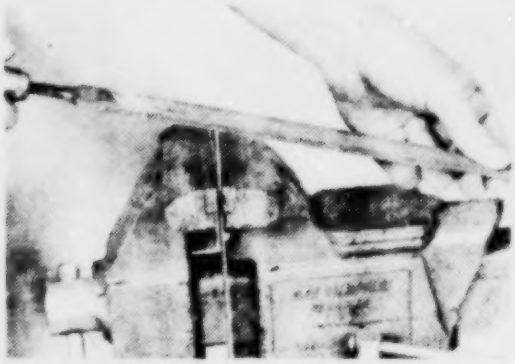
STEP 12 – Release some of the pressure of the front hand when the file reaches the center.



STEP 13 – Apply more pressure with the back hand for the rest of the stroke.



STEP 14 – The file cuts only in one direction on the forward stroke. It should be lifted on the return stroke.



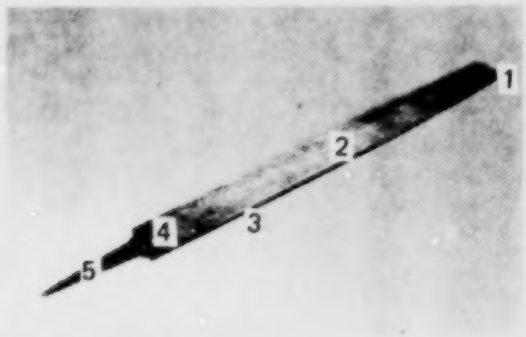
STEP 15 – Keep the file from rocking on the metal; this is the most common error.

STEP 16 – Cleaning a file is done with a file card.

Check Point

Match the parts of a file with the correct name by placing the number in the blank on the answer sheet for Instructional Objective IV.

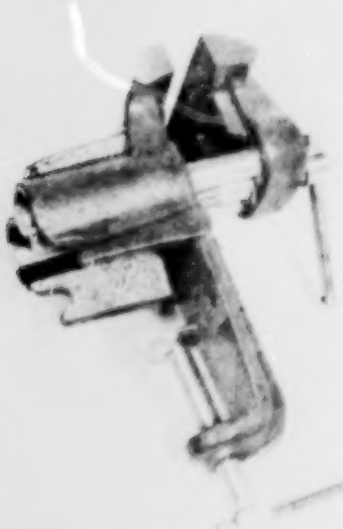
A – Tang
B – Face
C – Point
D – Edge
E – Heel



STEP 17 – To check your answers: A - 5, B - 2, C - 1, D - 3, E - 4

Instructional Objective V

The student will identify the parts of a vise and will learn how to use the vise.



STEP 1 – There are four basic parts to a vise, the handle, table clamp, jaws, and body.

STEP 2 – The table clamp is adjustable so that it will fit different tables. The adjustment has a bolt going through it which, when run in, tightens on the table.

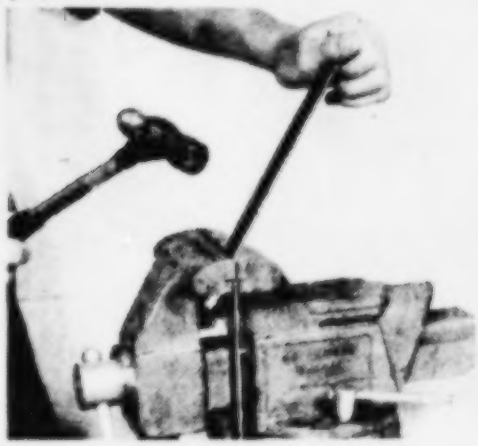
STEP 3 – The handle is on the end of a big bolt which tightens or loosens the vise.

STEP 4 – The body is the largest part of the vise; it gives the vise strength.

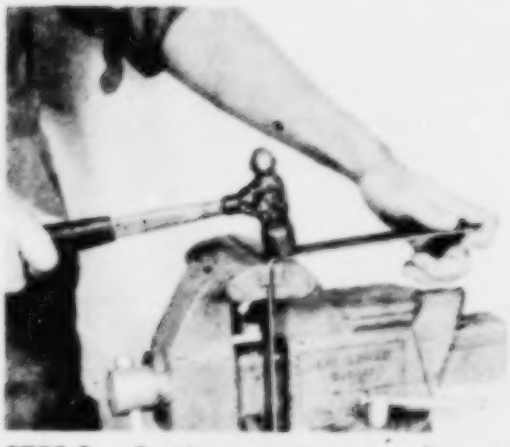
STEP 5 – The jaws are what clamp the metals in place.

STEP 6 – Using a vise to bend metal, place the metal in the vise and tighten the jaws against the metal.

STEP 7 – Pick up the 8 oz. (226.8 g) ball peen hammer.

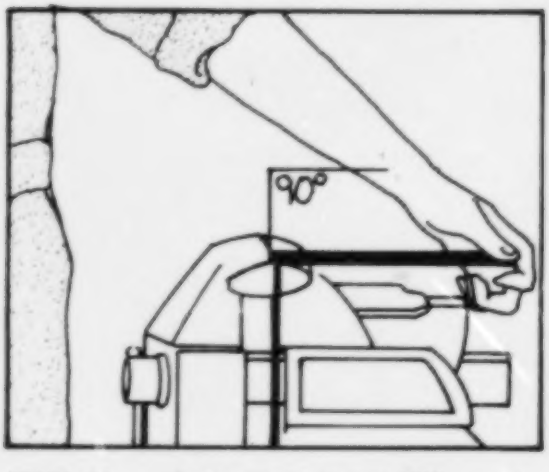


STEP 8 – Start the bend by lightly hitting the metal case close to the vise.



STEP 9 – Continue tapping the metal until it is bent down to 90° or a right angle.

STEP 10 – Take the metal out of the vise and check it with a square.



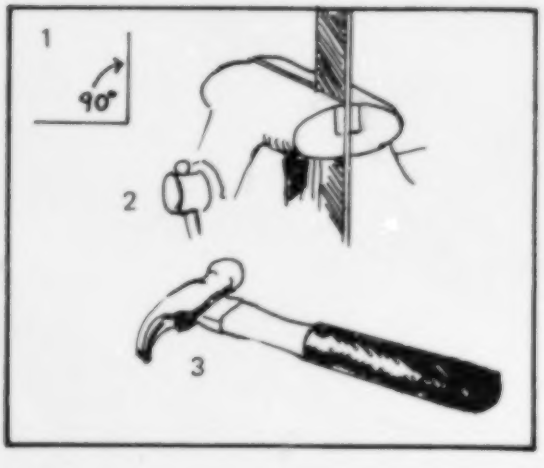
STEP 11 – If the metal is not 90°, put it back in the vise with the bend parallel to the jaws.

STEP 12 – Tap it with the hammer and then check it with the square.

Check Point

Answer the following questions with either a YES or a NO in the blank on your Student Answer Sheet for Instructional Objective V.

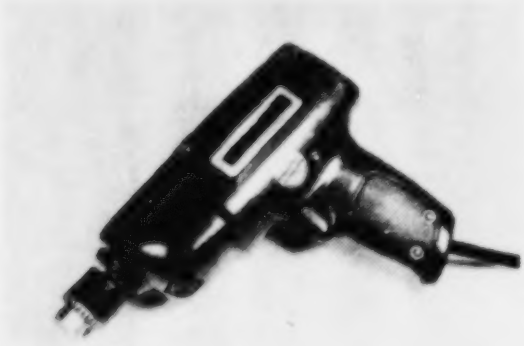
(1) This is a right angle
(2) This is the correct way to put metal in a vise before bending it.
(3) This is the correct hammer to use when bending metal.



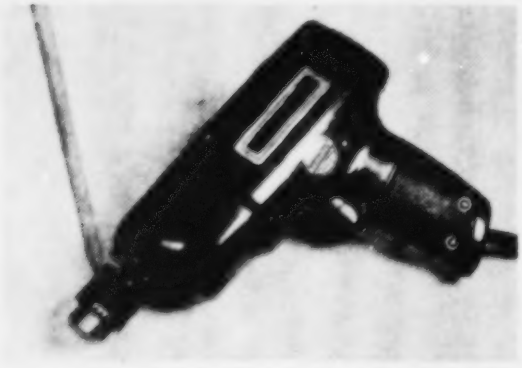
STEP 13 – When you have answered the questions, check your answers. 1 – yes, 2 – yes, 3 – no.

Instructional Objective VI

The student will identify the parts of a ¼" (.635 cm) hand power drill, how to use the drill correctly, and the safety rules which are observed when using a drill.

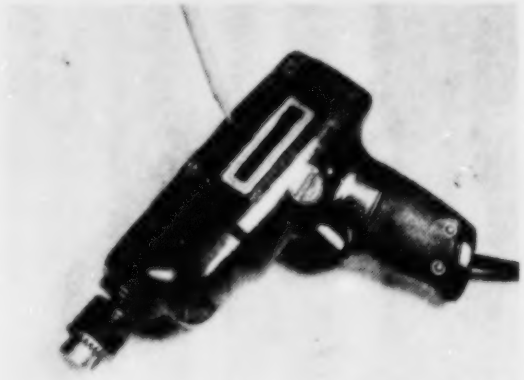


STEP 1 – The parts of a ¼" (.635 cm) hand drill are the chuck, trigger switch, handle, power cord, and chuck key.

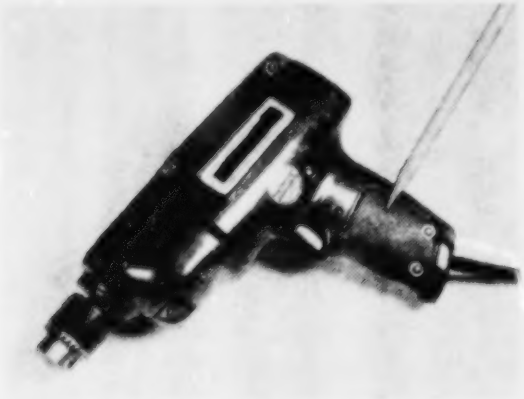


STEP 2 – The chuck holds the drill bit and it is tightened with the chuck key.

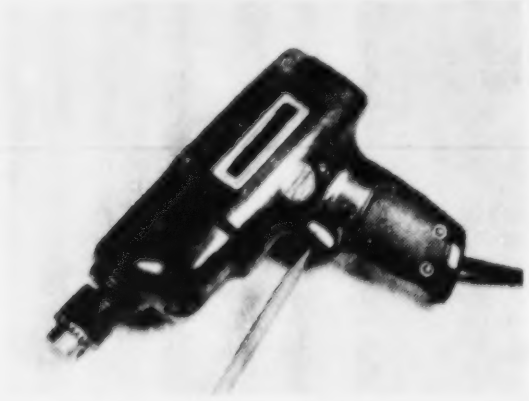
STEP 3 – The chuck key fits in the chuck.



STEP 4 – The frame of the drill protects the electric motor which drives the drill.



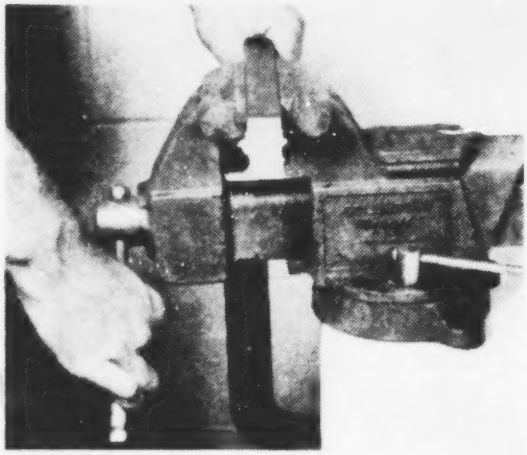
STEP 5 – The handle is used to hold the drill.



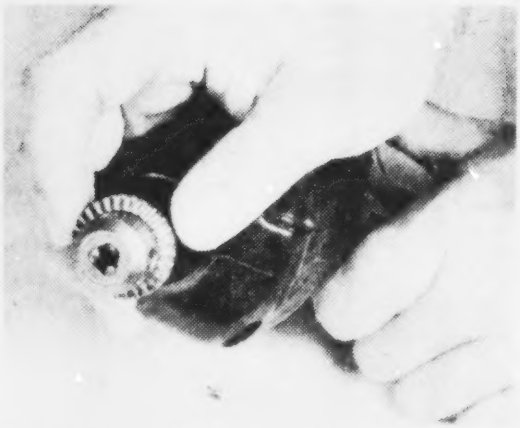
STEP 6 – The trigger switch is mounted in the handle; it is spring loaded to turn the drill off when you release the trigger.

STEP 7 – The power cord is used to plug the drill into a wall outlet.

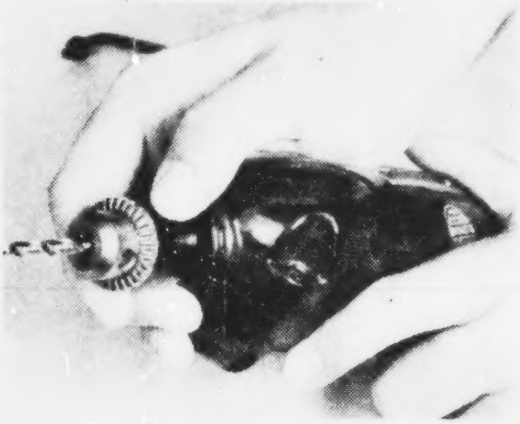
STEP 8 – REMEMBER THIS SAFETY RULE. Always wear safety glasses when using a drill.



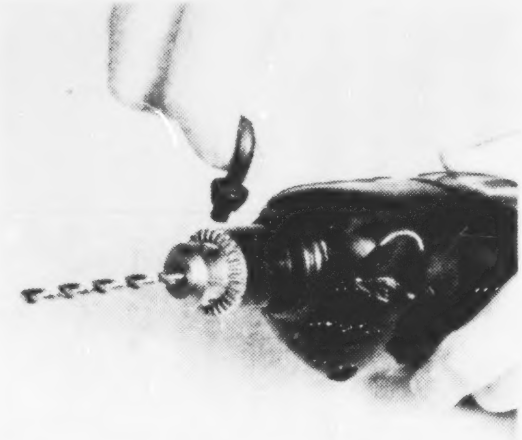
STEP 9 – REMEMBER THIS SAFETY RULE. Always put the metal to be drilled in a vise.



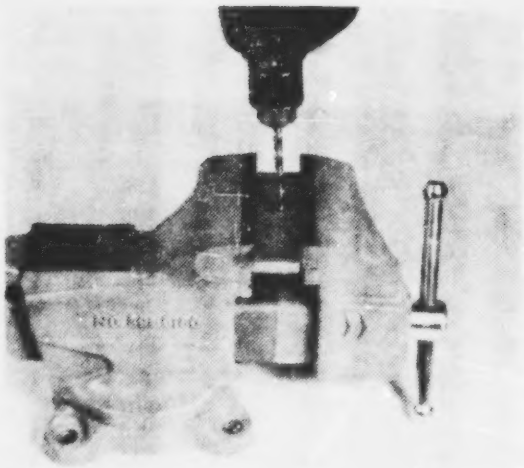
STEP 10 – To put a drill bit in a drill, the chuck may need to be loosened.



STEP 11 – Put the bit in the drill with sharp point out, then tighten chuck against the bit.

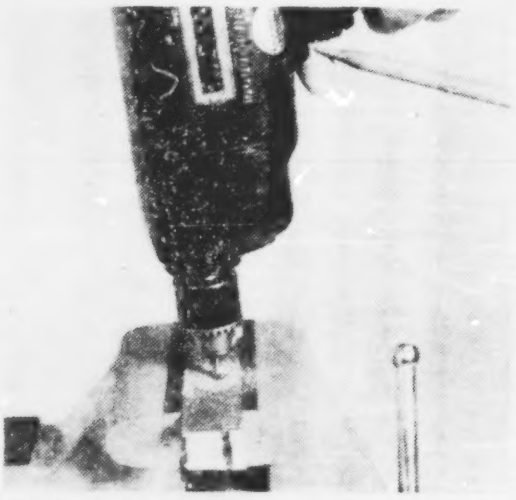


STEP 12 – Remember to remove chuck key before starting drill.

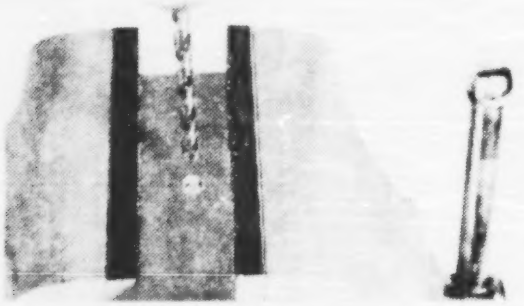


STEP 13 – Put the drill bit point against the metal to be drilled and hold the drill straight.

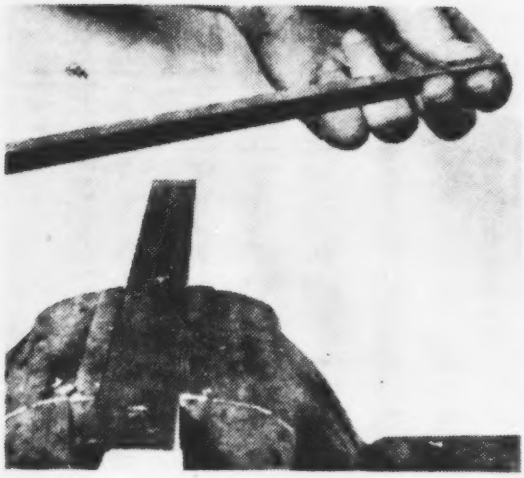
STEP 14 – The drill should be 90° to the metal.



STEP 15 – Drill the hole; when the bit goes through the metal, release the trigger to stop the drill.



STEP 16 – Pull the drill upward taking the bit out of the hole.



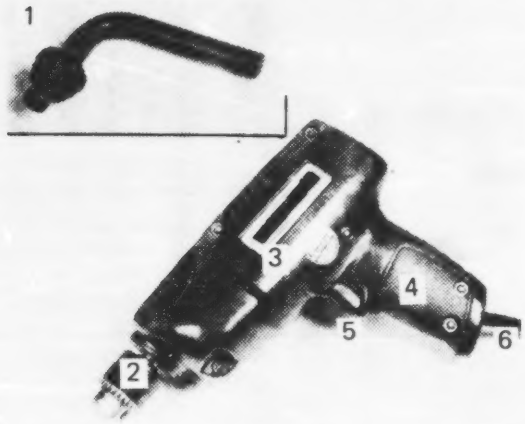
STEP 17 – There will be burrs on the bottom of the metal where the hole was drilled.

STEP 18 – Use a file to remove the burrs.

Check Point

Identify the following parts of a power hand drill on your answer sheet.

A.	Handle	D.	Chuck Key
B.	Trigger Switch	E.	Chuck
C.	Electric Cord	F.	Frame

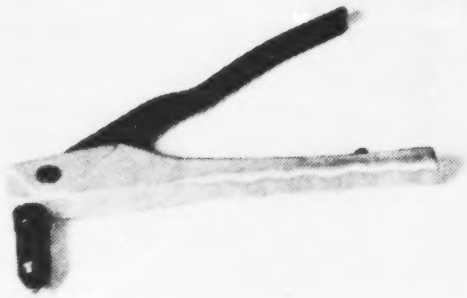


STEP 19 – When you have completed check-point, check your answers with the ones below.

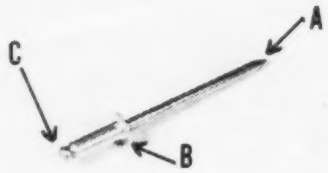
A – 4
B – 5
C – 6
D – 1
E – 2
F – 3

Instructional Objective VII

The student will identify the parts of a pop rivet gun and will learn the proper use of a pop rivet gun.

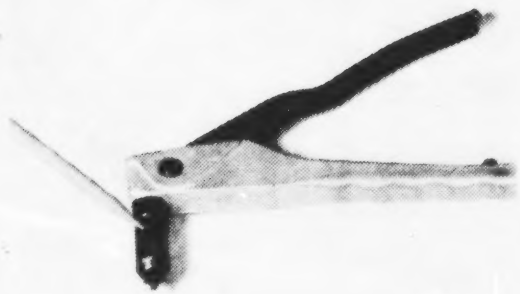


STEP 1 – The pop rivet gun has three basic parts: the setting tool body, the nose piece, and the handle.



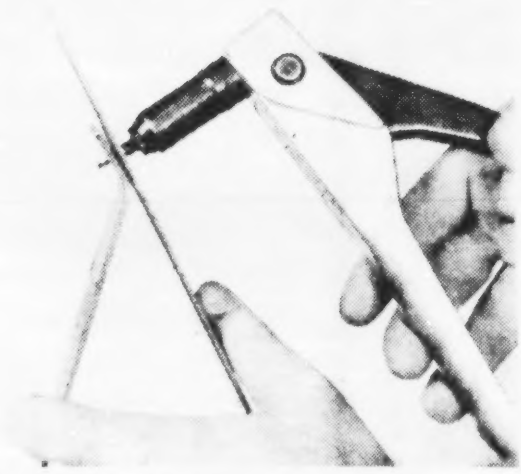
STEP 2 – The pop rivet has three basic parts: (A) mandrel, (B) rivet, and (C) head.

STEP 3 – The handle on the gun is raised to allow the rivet to be put in the gun.

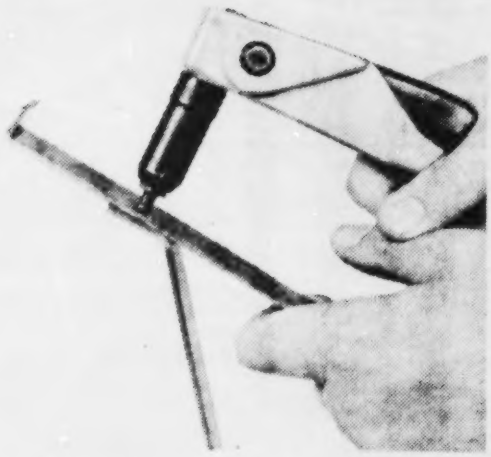


STEP 4 – The nose piece is where the pop rivet is put.

STEP 5 – To set the rivet, mash down on the handle by squeezing to the setting tool body.



STEP 6 – This causes the mandrel to be pulled upward; thus flaring out the end of the rivet when the head of the mandrel is pulled into the rivet.

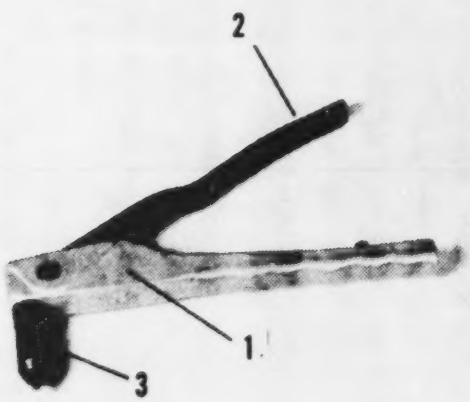


STEP 7 – When the handle gets really light, the mandrel will break and come out of the rivet leaving the head in the rivet.

Check Point

Match the parts of the pop rivet gun with the correct name by placing the number in the blank on your answer sheet.

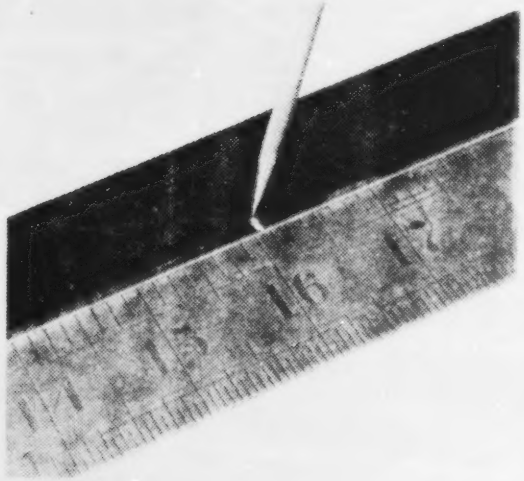
A. Setting tool body
B. Handle
C. Nose piece



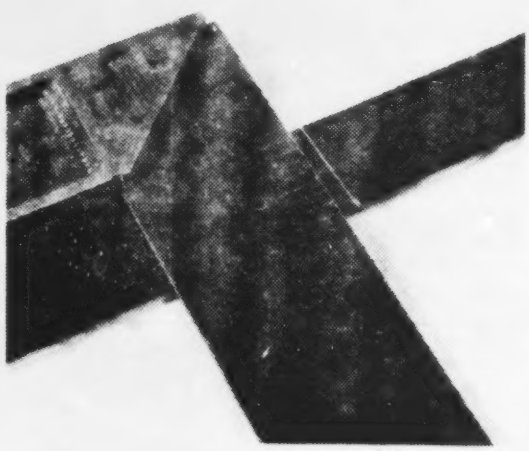
STEP 8 – Check your answers:
A. 1, B. 2, C. 3

Instructional Objective VIII

The student will measure and mark 16" (40.64 cm) of metal stock.



STEP 1 – Using the metal rule, measure a piece of ½ x 1/8 flat metal, 16 inches long (40.64 cm) and mark it.



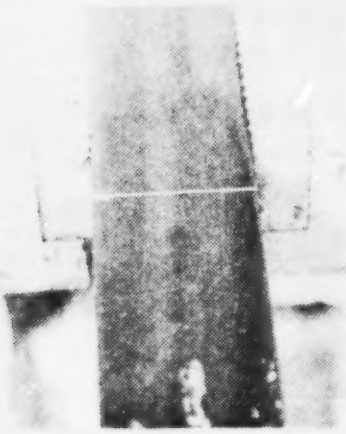
STEP 2 – Using the square, line it up on the mark at 16 inches (40.64 cm). Scribe a line across the metal.

Check Point

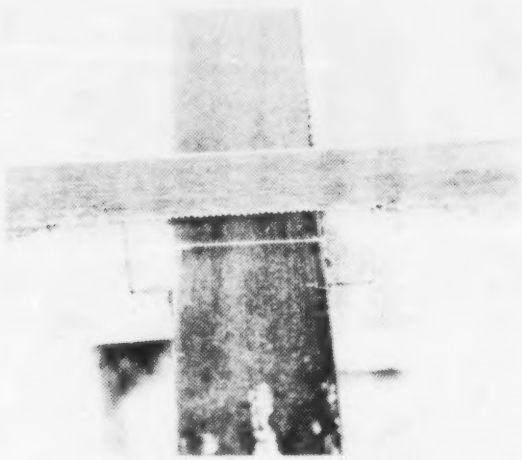
Have another student re-check your measurement.

Instructional Objective IX

The student will cut off and clean the 16" (40.64 cm) of metal stock.



STEP 1 – Place the metal in a vise with the line on top and place the line as close to the vise as you can, not cutting the vise with the saw.



STEP 2 – Place the saw on the mark and cut the metal strip. Lay the saw down.

STEP 3 – Take the metal out of the vise.

STEP 4 – Check the cut end with the square to see if the cut was square; if not, put the metal back in the vise with the cut end sticking up about ½ inch (1.27 cm) from the vise.

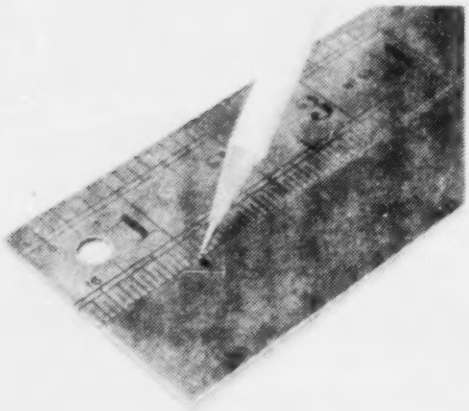
STEP 5 – Pick up the file and file the end of the piece of metal until it is square. Lay the file down.

Check Point

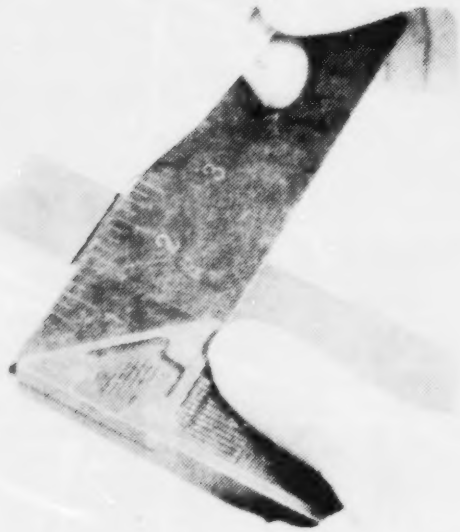
Have another student check your work with a square to be sure the metal is square.

Instructional Objective X

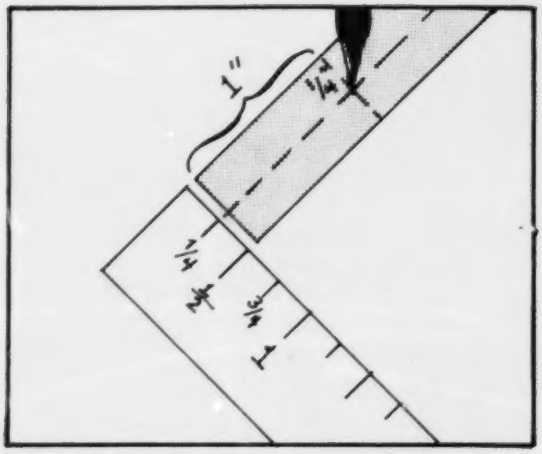
The student will measure and mark lines for drilling.



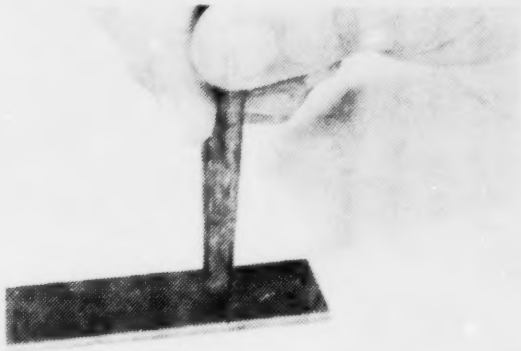
STEP 1 – Take this piece of metal out of the vise. Take the metal rule and measure from one end 1 inch (2.54 cm). Mark it with a pencil.



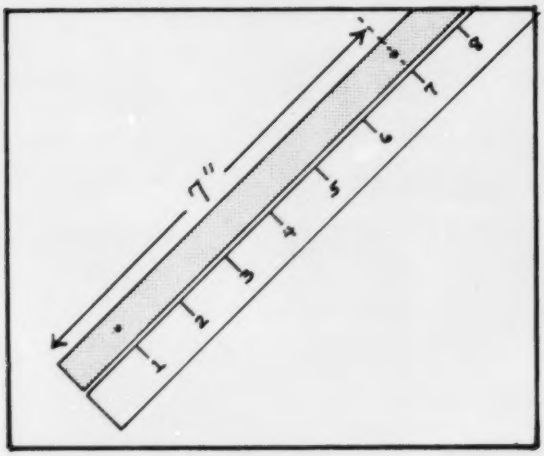
STEP 2 – Using the square, put it on the mark and scribe a line across the metal.



STEP 3 – Now, take the metal rule and measure in ¼" (.635 cm) on the line you just made. Scribe a mark. This will locate the center of the piece of metal.

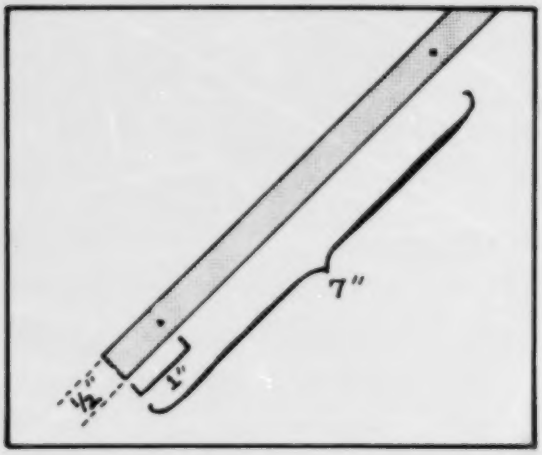


STEP 4 – Pick up the punch and ball peen hammer and punch the lines where they cross.



STEP 5 – Using the metal rule, measure up from the end 7 inches (17.78 cm) and repeat steps 2, 3, and 4.

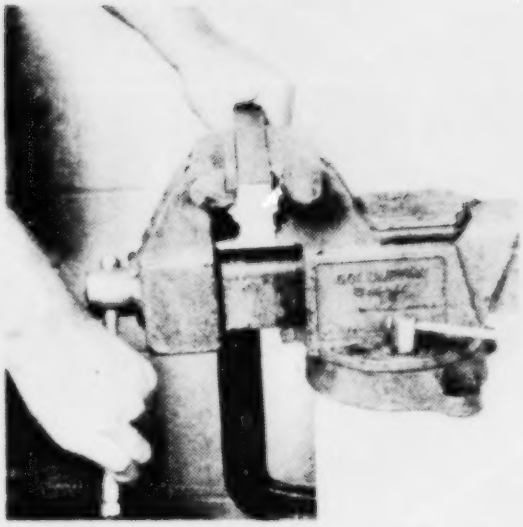
Check Point



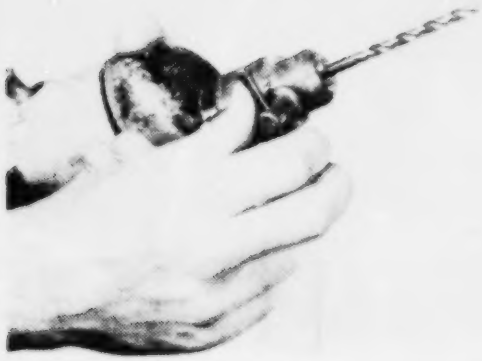
Does your metal look like the drawing?

Instructional Objective XI

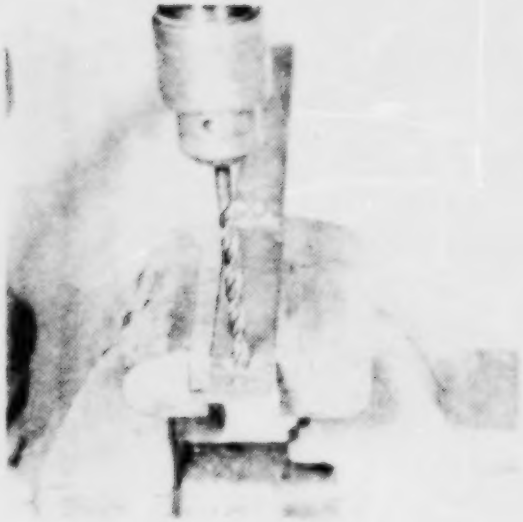
The student will drill and clean 2 holes.



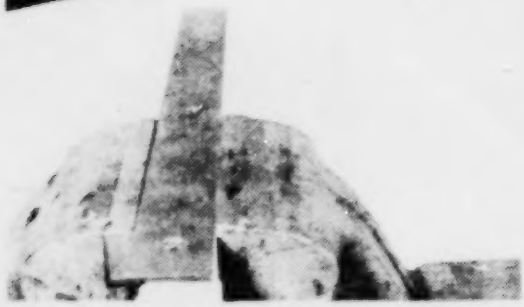
STEP 1 – Place the metal in the vise with the punch marks up.



STEP 2 – Pick up the hand drill; put in the ¼ inch (.635 cm) drill bit.



STEP 3 – Drill holes at the two punched marks.



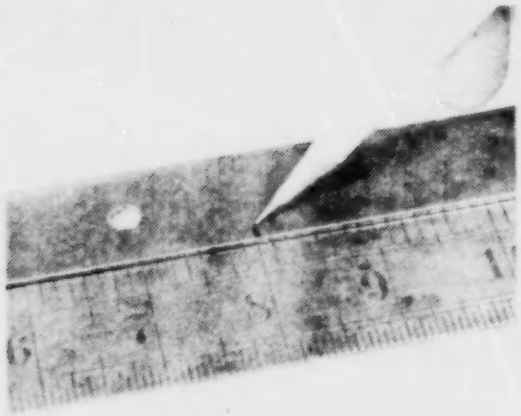
STEP 4 – Turn the metal over and using the file, remove the burrs from this side.

Check Point

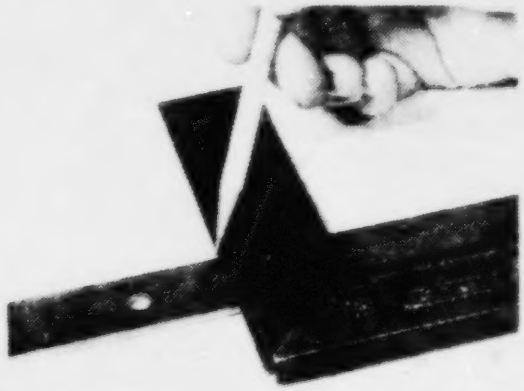
Make sure there are no burrs around the hole.

Instructional Objective XII

The student will measure and scribe a line 8" (20.32 cm) from one end of the metal.



STEP 1 – Take the metal out of the vise, get the metal rule, measure from the end 8 inches (20.32 cm) and place a mark.



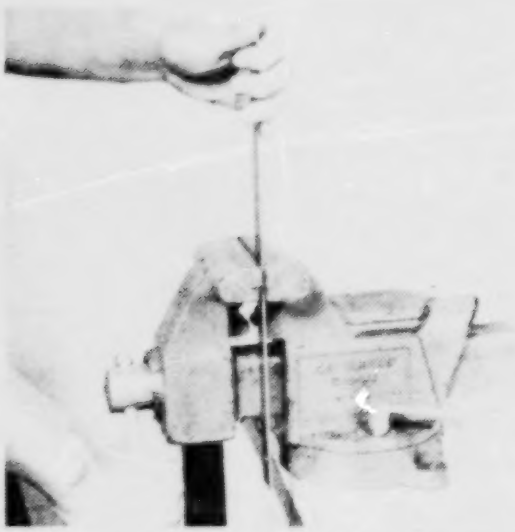
STEP 2 – Using the square, place it on the mark at 8" (20.32 cm). Scribe a line across the metal.

Check Point

Can you see the scribed lines? Have a student remeasure the 8" (20.32 cm).

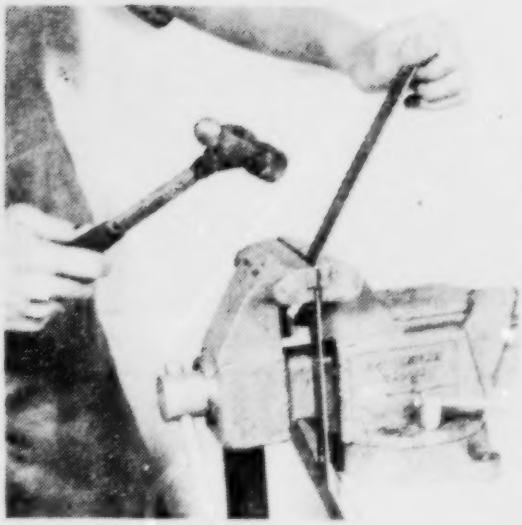
Instructional Objective XIII

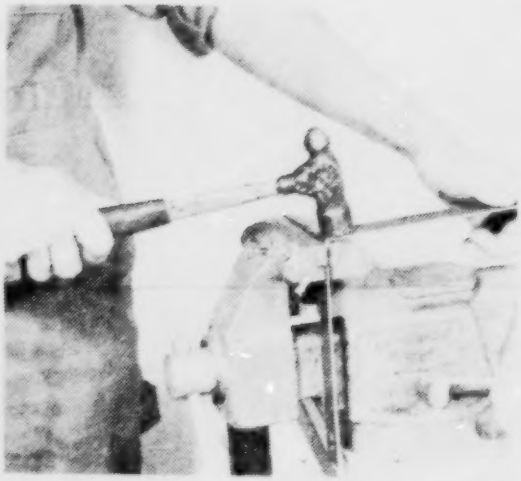
The student will bend right angles on scribed lines of metal.



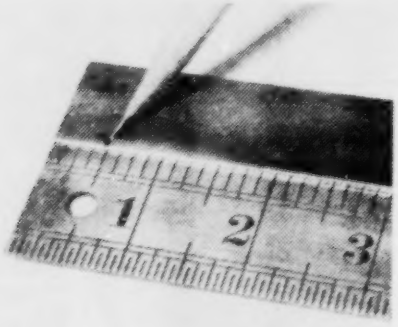
STEP 1 – Place the metal in the vise with the line just above the jaws of the vise.

STEP 2 – Tighten vise.

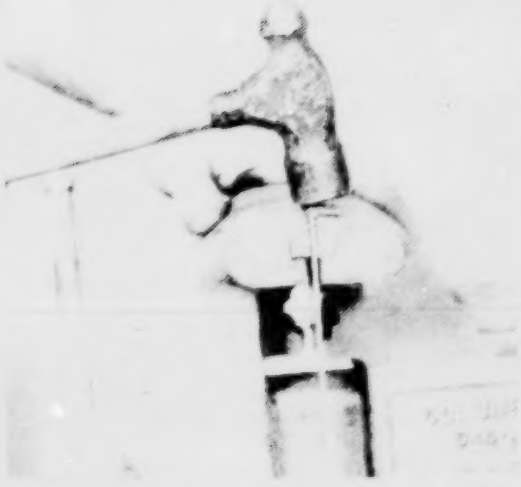




STEP 3 – Using the ball peen hammer, start hitting the metal close to the vise until it is bent in a right angle. Take the metal out of the vise.

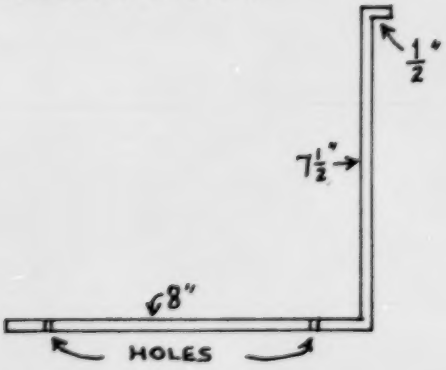


STEP 4 – Using the metal rule, measure in ½ inch (1.27 cm) on the opposite end of the metal. Place mark on the metal, then square a line across the metal.



STEP 5 – Place the metal in the vise with the ½ inch (1.27 cm) end tightened in the jaws of the vise. Repeat Step 3.

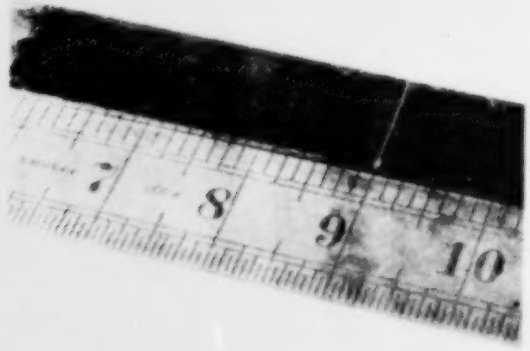
Check Point



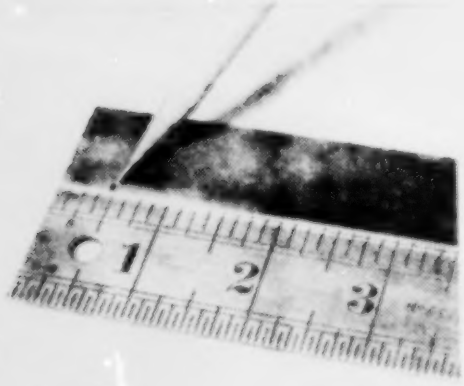
Check your metal with drawing your instructor has given you.

Instructional Objective XIV

The student will measure, cut, and mark a 9" (22.86 cm) piece of metal.

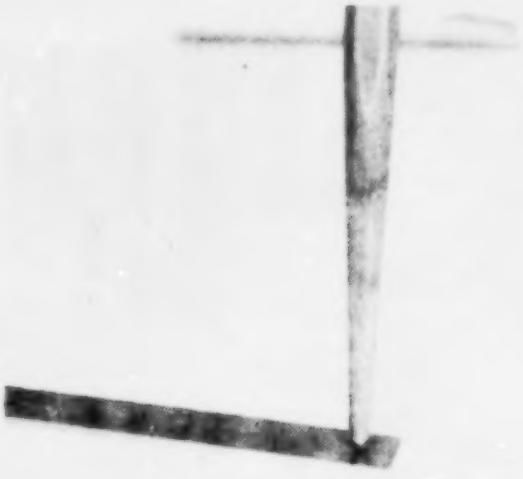


STEP 1 – Measure another piece of ½ x 1/8 flat metal 9 inches (22.86 cm) long. Repeat objectives on measuring and cutting metal.



STEP 2 – Measure ½" (1.27 cm) in from the end. Put a mark.

STEP 3 – Measure in from the other end ½" (1.27 cm) and place a mark.



STEP 4 – Use the square and scribe a line through the marks on each end. Now repeat steps followed in measuring ¼" (.635 cm) and center punch a mark on your metal.

Check Point

Have a fellow student remeasure your 9" (22.86 cm) metal.

Instructional Objective XV

The student will drill 2 holes in the 9" (22.86 cm) metal.

STEP 1 – Place the metal in the vise with the punch marks up.

STEP 2 – Pick up hand drill, put in the 1/8 inch bit (.3175 cm).

STEP 3 – Now, repeat Instructional Objective XI in drilling and cleaning metal.

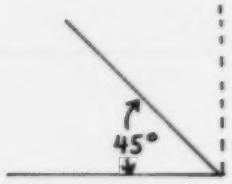
Check Point

Be sure there are no burrs on your metal.

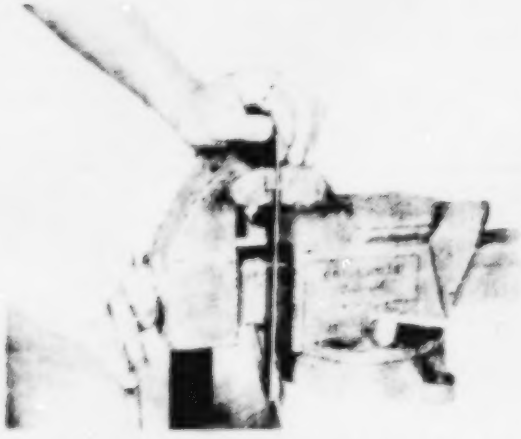
Instructional Objective XVI

The student will measure, scribe, and bend 45° angles on each end of the metal.

STEP 1 – Take the metal out of the vise and measure in from each end 1 inch (2.54 cm). Place a mark and scribe a line across the metal.



STEP 2 – This line is where the metal will be bent to a 45° angle or ½ of a right angle.



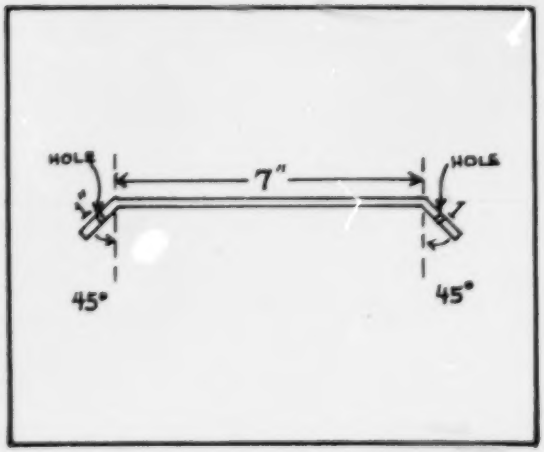
STEP 3 – Place the metal in the vise with the line just above the jaws and tighten vise.

STEP 4 – Using the ball peen hammer, start hitting the metal close to the vise until it is bent 45°. Check angle with protractor.

STEP 5 – Stop. Take the metal out of the vise and place the opposite end of the metal in the vise.

STEP 6 – Repeat, putting another 45° angle on the other end. Follow Steps 4 and 5. Be sure the bend is in the same direction as the previous bend.

Check Point



Check the 9" (22.86 cm) metal with your drawings for proper size.

40

Instructional Objective XVII

The student now has all the parts for the hanging basket bracket. The student will drill two holes needed to pop rivet it together.

STEP 1 – Pick up the longer (16") piece that you worked on first.

STEP 2 – Make a measurement of 2½" (6.35 cm) from the end that is flattened.

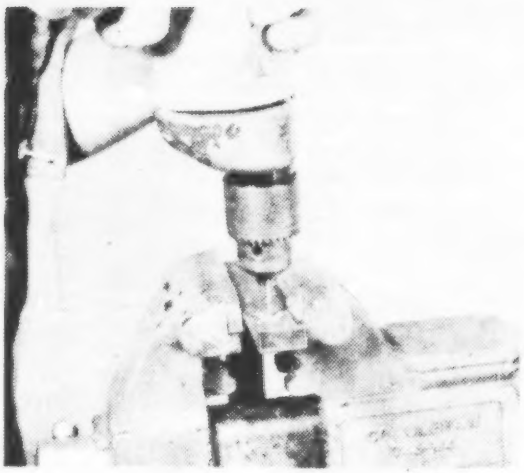
STEP 3 – Place a mark here. Repeat Instructional Objective X.

STEP 4 – Pick up hand drill, put in the 1/8 inch (.3175 cm) drill bit.

STEP 5 – Repeat Instructional Objective XI, except use the 1/8" (.3175 cm) drill bit.

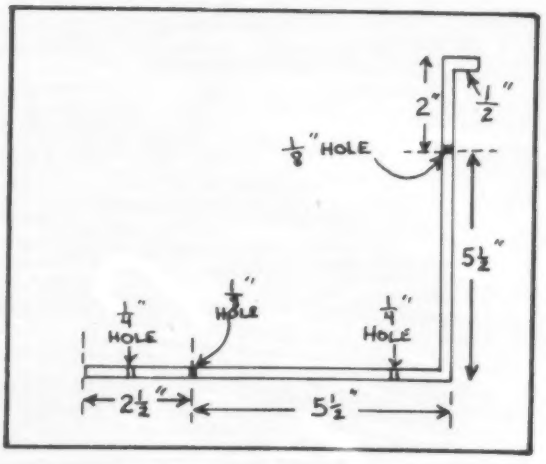
STEP 6 – Hold the long piece of metal and measure from the bend in the center of the metal out 5½ inches (13.97 cm) toward the end that has the ½" (1.27 cm) bend. Place a mark here.

STEP 7 – Mark holes for drilling following directions in Objective X.



STEP 8 – Drill holes in metal following the instructions in Objective XI.

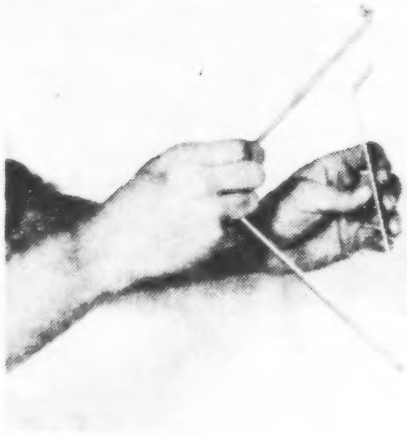
Check Point



Does your metal pieces resemble the drawing? Check the location of your holes.

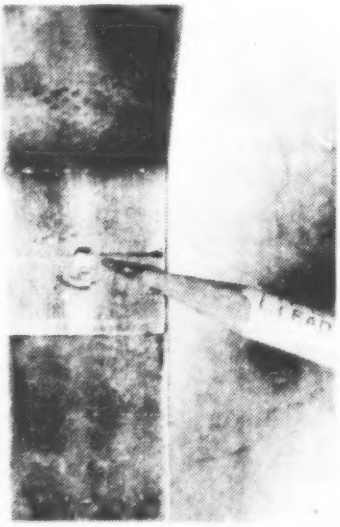
Instructional Objective XVIII

The student will pop rivet the bracket together.

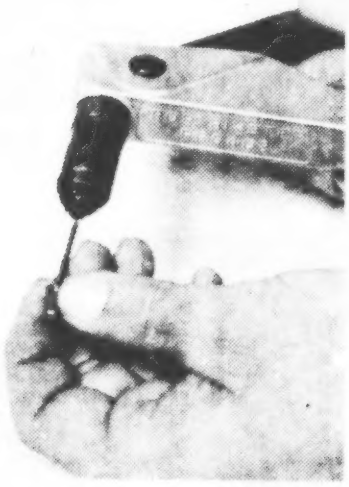


STEP 1 – Hold the long piece in one hand and the short piece in the other.

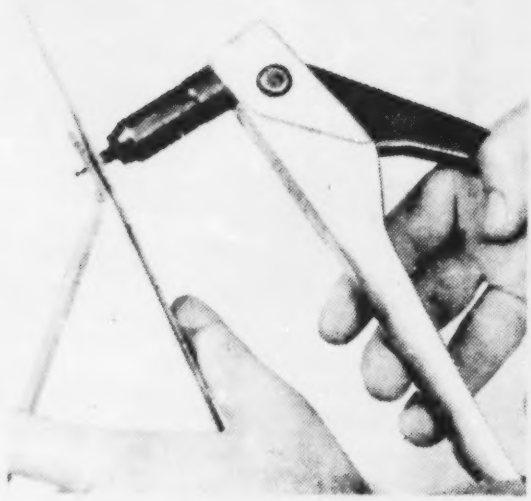
STEP 3 – If the holes line up, lay both pieces on the table, get the pop rivet gun.



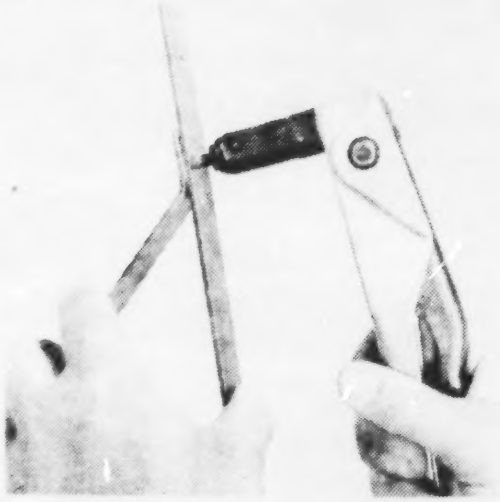
STEP 2 – Line up the 1/8" (.3175 cm) holes.



STEP 4 – Put a rivet in the pop rivet gun.

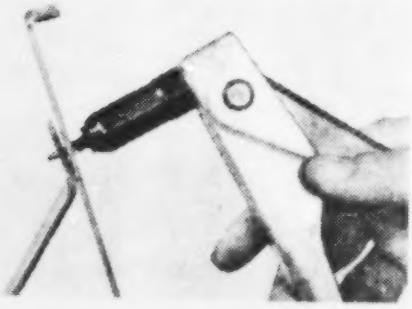


STEP 5 – Stick the rivet through the two holes.

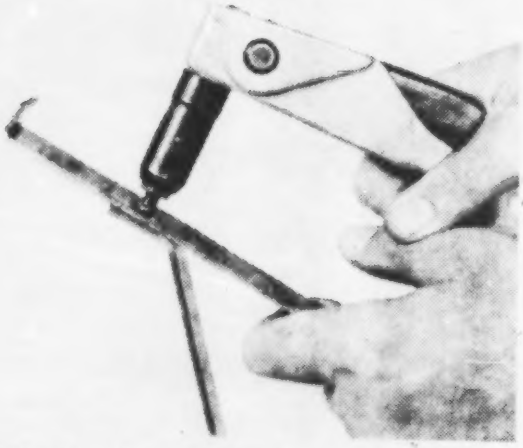


STEP 6 – Squeeze the handles and pop it in place.

STEP 7 – Place another rivet in the gun.



STEP 8 – Put it through the other holes.



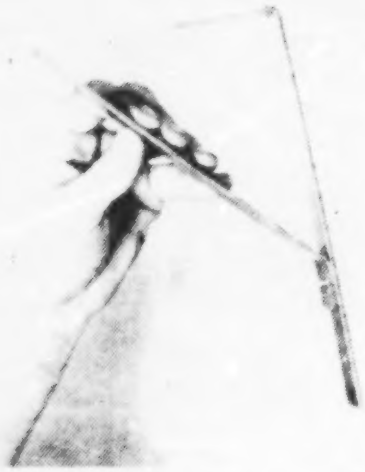
STEP 9 – Pop it in place.

STEP 10 – You have now completed your hanging basket bracket.

Check Point

Does your bracket look like the one illustrated?

Are your pop rivets in place?



606.682-014 DRILL-PRESS OPERATOR (mach. shop) production-drilling-machine operator.

Operates previously setup drilling machines, such as single- or multiple-spindle drill presses to drill, ream, countersink, spot face, or tap holes in metal or nonmetal workpieces according to specifications: Lifts workpiece manually or with hoist, and positions and secures it on machine table in drilling *jig* or holding *fixture.* Moves machine controls to feed tools into workpiece, and engages automatic feed. Observes machine operation and verifies conformance of drilled workpiece to specifications, using fixed gages, calipers, and micrometers. Changes worn cutting tools, using wrenches. Moves controls to adjust cutting speeds, feed rates, and depth of cut. May assist JOB SETTER (fabric. plastics prod.; mach. mfg; mach. shop) in setting up machine. May sharpen cutting tools, using *bench grinder.* May perform minor assembly, such as fastening parts with nuts, bolts, and screws, using power tools and handtools. May be designated according to product as BARREL REAMER (firearms); or function of machine as REAMER OPERATOR (mach. shop); TAPPER OPERATOR (mach. shop).

607.382-010 CONTOUR-BAND-SAW OPERATOR, VERTICAL (mach. shop)

Sets up and operates vertical contour-band saw to cut straight, curved, irregular, or internal patterns in metal of plastic stock, according to specifications, utilizing knowledge of sawing techniques: Reads work order or blueprints to locate cutting layout lines on stock, to determine dimensions and tolerances, and to determine metal to be cut, type of blade to be used, blade tension, cutting speed, feed rate, table angle, and positions of table stops and guides. Relieves saw blade support and drive-wheel tension to change blade and adjust tension. Turns controls to set prescribed cutting speed, feed rate, and table angle. Loosens table stops and guides, using handtools, and positions them to aline and secure workpiece. Places stock on cutting table, either manually or using hoist, and clamps it into position. Cuts saw blade, threads it through hole drilled in stock, welds blade together, using butt-welding attachment, and files weld smooth to cut internal pattern in stock. Starts saw and manually guides stock along layout lines to cut pattern, or engages automatic feed to cut straight line. Turns control to start airflow to blow metal cuttings away from kerf. Verifies conformance to specifications, using ruler, calipers, fixed gages, templates, and micrometers. May take precision cuts, using magnifier to see layout lines. May calculate and mark layout lines according to product specifications. May be required to have experience with particular product or size, type, or trade name of machine.

600.280-022 MACHINIST (mach. shop) machinist, all-around; machinist, first class; machinist, general, machinist, precision.

Sets up and operates machine tools, and fits and assembles parts to make or repair metal parts, mechanisms, tools, or machines, applying knowledge of mechanics, shop mathematics, metal properties, and layout and machining procedures: Studies specifications, such as blueprint, sketch, damaged part, or description of part to be replaced, to determine dimensions and tolerances of piece to be machined, sequence of operations, and tools, materials, and machines required. Measures, marks, and scribes dimensions, and reference points to lay out stock for machining [LAY-OUT WORKER (mach. shop)]. Sets up and operates metal-removing machines, such as lathe, milling machine, shaper, or grinder, to machine parts to specifications. Verifies conformance of workpiece to specifications using measuring instruments [TOOL-MACHINE SET-UP OPERATOR (mach. shop)]. Positions and secures workpiece in holding device, such as chuck or collet, or on surface plate or worktable with such devices as vises, V-blocks, and angle plates, and uses handtools, such as files, scrapers, and wrenches, to fit and assemble parts to assemblies or mechanisms. Verifies dimensions and alinement with measuring instruments, such as micrometers, height gages, and *gage blocks.* May operate mechanism or machine, observe operation, or test with inspection equipment, to diagnose malfunction of machine or to test repaired machine. May perform flame cutting and arc or gas welding operations, when required. May develop specifications from general description and draw or sketch product to be made.